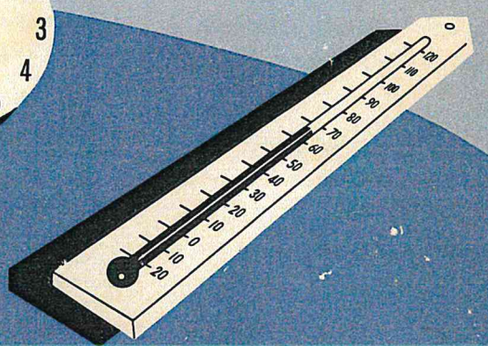
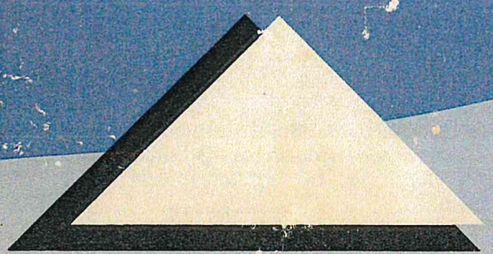
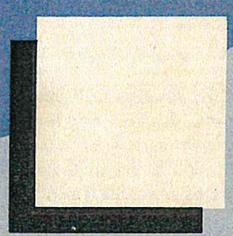
PRENTICE-HALL

ARITHMETIC 2







TEACHERS EDITION

PRENTICE-HALL

ARITHMETIC 2

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Prentice-Hall, Inc., Englewood Cliffs, N. J.

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Prentice-Hall authors have developed a program with a strong emphasis on mathematical structure and analysis based on a thorough knowledge about children of this age level. Heavy use is made of applications to illustrate uses for the mathematical ideas being developed.

This Teachers Edition provides a detailed outline of every lesson and suggested teaching procedures. The teacher will soon see how each lesson may be adapted to the particular needs of her class and also to the individual needs of each pupil.

The *purpose* on the Teachers Edition page provides a summary statement of the specific aim of the lesson.

The *vocabulary* alerts the teacher to mathematically useful and accurate words to be included in the class discussion and lesson development.

The *materials* section lists "things" that may be used effectively in developing the lesson.

The *developmental activity* suggests a stimulating learning situation that takes the class directly into the concept being dealt with by each lesson. Words in **boldface** type may be said to the pupils. Explanatory material is given in lightface type.

The *procedure* suggests a method for working with the page. It may be adapted easily to the teacher's own language. Activity for the pupils is suggested in this section.

The *extended activity* takes the children an additional step in extending the application or the meaning of the lesson.

1

Purpose

To enjoy pictures taken from the air. To review circles, squares, rectangles, and triangles.

Vocabulary

Aerial picture, round, square, rectangle, triangle.

Materials

Collect aerial photographs, if possible, or sketch a rough aerial view on the chalkboard. Crayons for each child.

Developmental Activity

Ask the children what they think they might see from the air during an airplane flight. On the chalkboard, list the things they mention. Discuss whether these would look large or small to the passengers in a plane.

Tell the group that people often take photographs from the air. Show the children some of these photographs or sketch an aerial photo on the chalkboard.

Procedure

The first page in our books is an aerial map or a picture map photographed from the air. Do you see something on the ground that is round? What do you think it is? [pond] **I think it is a pond, too, because I can see some ducks and a rowboat on the water.** Have the children outline the pond with blue crayon. **Do you see other things that are round in shape? Color the trees like small green round shapes.**

Near the barn there is something that is round and tall. Food for the cattle is kept here. Does anyone know its name? [silo] **Put an X on the silo.**

Hold up a rectangular piece of paper. **What shape is this? Draw a green X on each field that is shaped like a rectangle. How many are there?** Check the children's work.

Do you see any square fields? Color the square fields brown.

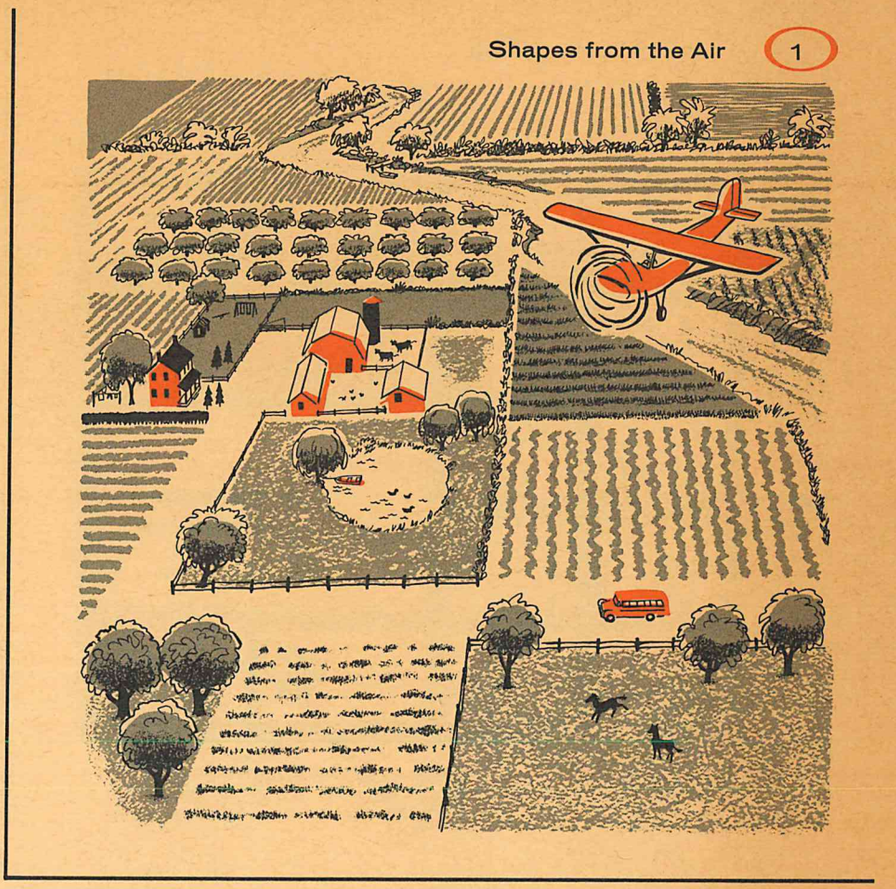
Look carefully near the winding river and you will see another shape that we know. What is it? [triangle] Have the children outline all the fields shaped like triangles. **Can you find a group of trees you could fit into a triangle?** [lower left corner] **Draw a triangle around them.**

Let us check our maps to see if we have discovered all the shapes.

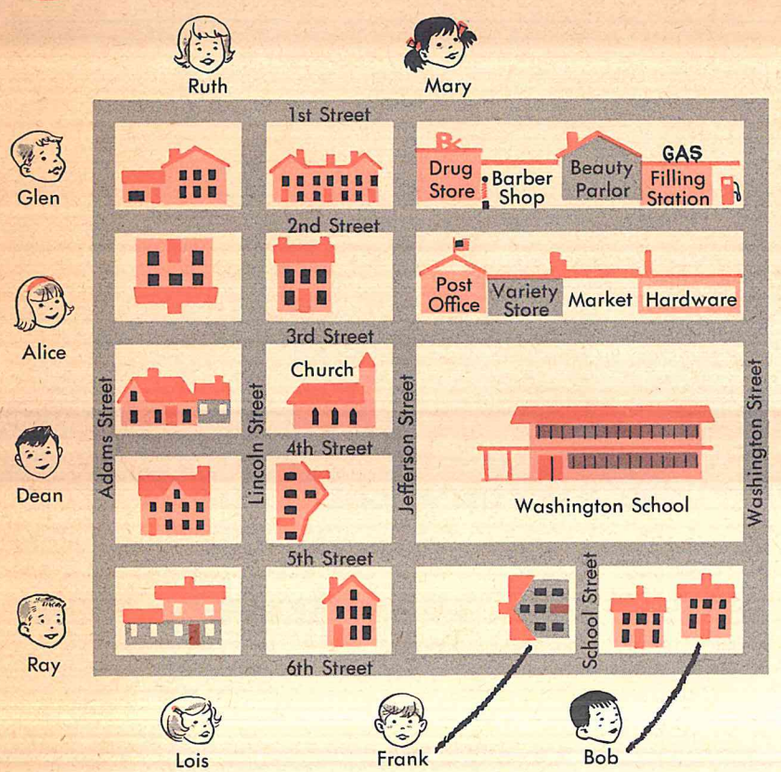
Extended Activity

Suppose we pretend we are photographers who are flying in an airplane. We are taking pictures of the earth below. Let us see if we can draw a map showing some square things, some round things, some things shaped like triangles and rectangles.

I will give you some large paper and you may work in pairs. I want to see your work when it is finished. Then you may share it with the other class members who have been making maps also.



2 A Neighborhood Map



2 3

Purpose

To develop the relationship of area to space. To give meaning to the language of location, direction, and distance. To lay a foundation for reading maps and graphs.

Vocabulary

Neighborhood, north, south, east, west, distance, next to, far away, close, how many, how far, street, block, direction, up, down, around, across, right side, left side.

Materials

Butcher paper, manila drawing paper, bright yarn, India ink, crayons, yardstick.

Developmental Activity

Discuss the map on pages 2 and 3 in detail. Use the discussion to build readiness for taking a neighborhood walk and making a map.

Which two children live nearest to Washington School? Put an X on each of these children.

Draw a line from Mary to a house in which she might live. With your pencil show how Mary would go from her house to the market.

Find the golf course. Put an X on each of the flags on the golf course. How many flags are there?

I'm very anxious to know each of you and your families. I want to find out where each of you lives and which children live on the same street or in the same neighborhood. Would you like to know more about each other? Suppose we take a walk tomorrow morning to see what we can learn. We can look for the grocery store, the service station, the drug store, the park, and other places.

Arrange for the class to take a study trip. You might plan to have some Junior Traffic boys or a few mothers accompany the group. Before leaving the schoolyard, point out directions. **If we go this way** (point north) **we will be going north. If we turn around we will be going south. This is east. The sun comes up in the east.** Show west. With a stick mark the directions on the ground. Have the children all face north, or all face south.

It is impossible to plan to see every child's home, but even a limited firsthand experience helps in teaching ideas of area, direction, and location.

Procedure

Discuss the walk with the group. On the chalkboard write ideas that can be referred to later. List names of streets and directions. Have the children tell about places, homes, and buildings around the given area. Help the children to organize their ideas.

Prepare in advance 4 chart forms—one for each direction. Draw lines on the charts so that children may write on them. (This is also a lesson in manuscript writing.) The chart may look like this:

WE LIVE NORTH OF THE SCHOOL	
NAME	ADDRESS
Dolly Dean	1624 Grey Street

(Continued on next page.)

(Continued from page 2.)

Make an area map on butcher paper. (Having a commercial map of the locality will prove very helpful in this project.) Let the children help measure the amount of paper needed. Have a child draw and cut out a picture representing the school building. Start the map by pinning a cutout picture of the school to the paper. (Cutouts and pins allow for more flexibility and fewer errors than drawings made directly on the map.)

With guidance, the children may use a yardstick to draw streets on the map. Outline the pencil lines with black crayon. Then have the children write in the street names.

On another day ask the children to draw pictures of their homes, cut them out, and pin them on the map in their approximate location. If time permits and there is room on the map, let the children draw and cut out pictures of stores, churches, filling stations, other buildings, and parks. (Their size will depend on the overall size of the map. Drawing to scale is not recommended at this grade level.) Have these put in their proper locations.

Give each child a 4″ square piece of manila drawing paper. Have him draw a picture of his face with crayons. Cut out the picture. Then, with help, let each child attach bright yarn from his picture to the picture of his home. Following this, have each child write his name on manuscript paper and paste or pin it under his picture.

Let the children decide what the title of the map should be. It could be "This Is Our Neighborhood" or "Our Neighborhood Map."

With the children's help make a chart to summarize the learnings. It might read like this:

OUR NEIGHBORHOOD

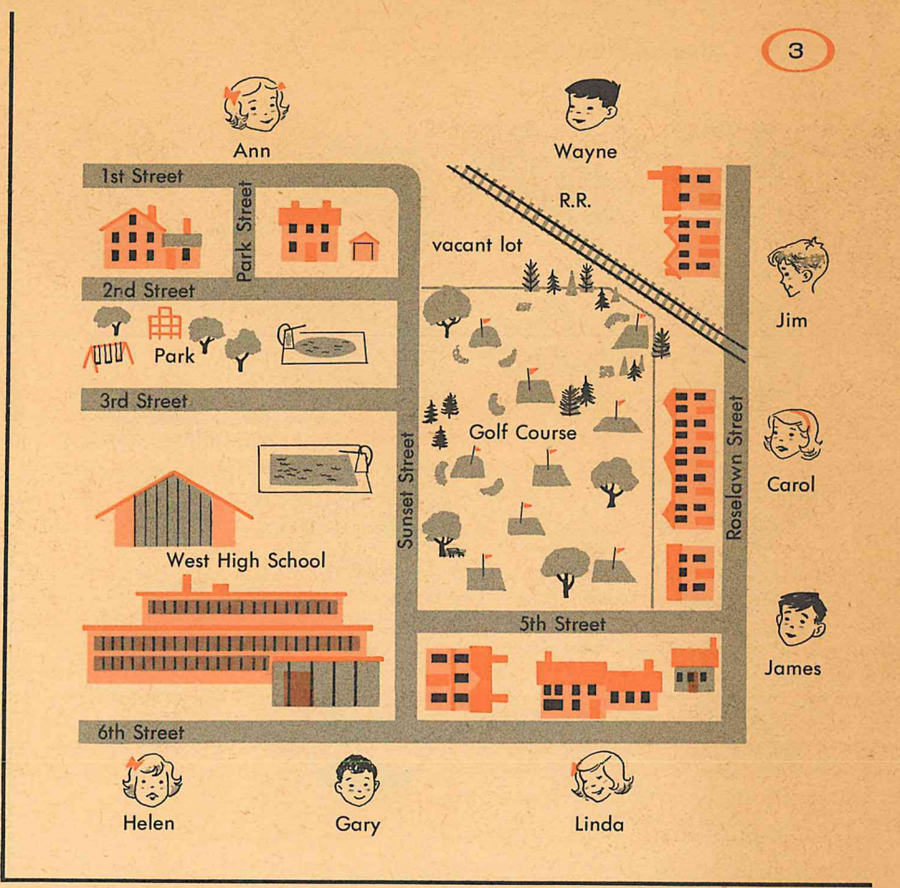
All of us go to Washington School.
Near our school is the high school.
If we stand in front of our school,
  we can see many trucks go by.
Many of us play in the park after school.
We have lots of room to play.
Some of us go to church nearby.
Many of us live side by side;
  we are friends.
We think this is a good neighborhood.

Extended Activity

Invite another class to see the map. Let several children locate their homes, give the name of the street and house number, tell how far they live from school, and in which direction they go to and from school.

As children share the map, listen for their use of mathematical terms. Correct any wrong impressions they may have.

File the map for reference, use it throughout the year.



4

Purpose

To familiarize children with shapes found within their environment.

Vocabulary

Object, circle, square, rectangle.

Materials

Common objects within the school. Circle, square, rectangle, and triangle drawn on chalkboard.

Developmental Activity

Geometric shapes are found in the children's environment; however, if the form or shape is not called to their attention, children often do not notice it. Examine the room environment to note the shapes of common objects—for example, the clock, the window panes, books, aquarium, chalkboard, and bulletin board. Draw circles, triangles, etc., on the chalkboard.

Procedure

Open your books to page 4.

Today we are going to look at some things found in Mother's kitchen. Who can name all the things in the first row?

What are the objects in the second row?

What are the objects in the third row?

Name the things in the last row.

Now take your pencil and make an X on everything on the page that is round like a circle.

Next draw a line under everything you see that is square.

Now put a ring around everything you see that is shaped like a rectangle.

Check the work to see how many children are correct.

We will read the sentence in the empty box at the end of each row. You may complete the page by yourself. In the last box have the children draw whatever they like. It should be something round, square, or rectangular.

5

Purpose

To use shapes in making designs.

Vocabulary

Design, circle, triangle, square, rectangle, arrange.

Materials

An envelope with assorted shapes of colored paper. White paper, paste.

Procedure

Open your books to page 5. There are many designs on this page.

Artists make designs in their drawings. Materials for dresses, wallpaper, and draperies often have designs in them. These designs are sometimes made from squares, circles, triangles, and rectangles. Some things in your home may have designs made from these shapes. Look for them.

Let us look at this page and see what we can discover. Look at the first picture. What does this remind you of? What is the snowman sitting on? [a box shaped like a rectangle] **What shape is the snowman's body? his head? his arms? his eyes? his nose? Even his mouth is part of a circle.**

What is different about the snowman in the picture below?

What does the last picture in the first column remind you of? [Christmas tree] **Of what is the tree made?** [triangles] **How many triangles do you see?** [3] **Can you make a tree like this one?**

Now look at the other design at the top of the page. Look at it carefully to see if you can decide what shapes you see. When squares are turned like these, we say they are diamond shaped. What has been placed inside many of the diamonds? [circles]

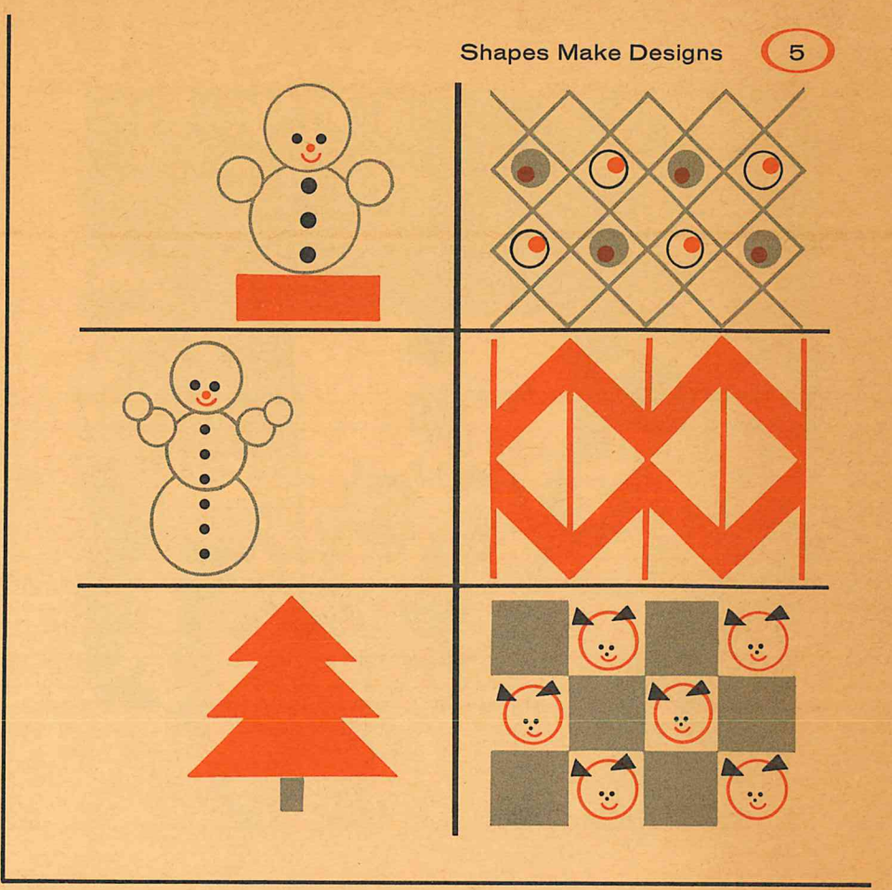
Who can discover what shape was used to make the next design? [triangle] **How many triangles can you see?**

The last design on the page reminds me of a checkerboard. Do you know what a checkerboard is? What shape are the boxes in this design? [squares] **Who can tell me what shapes were used to make the funny faces in the squares?** [circle, triangle, part of circle (curved line)]

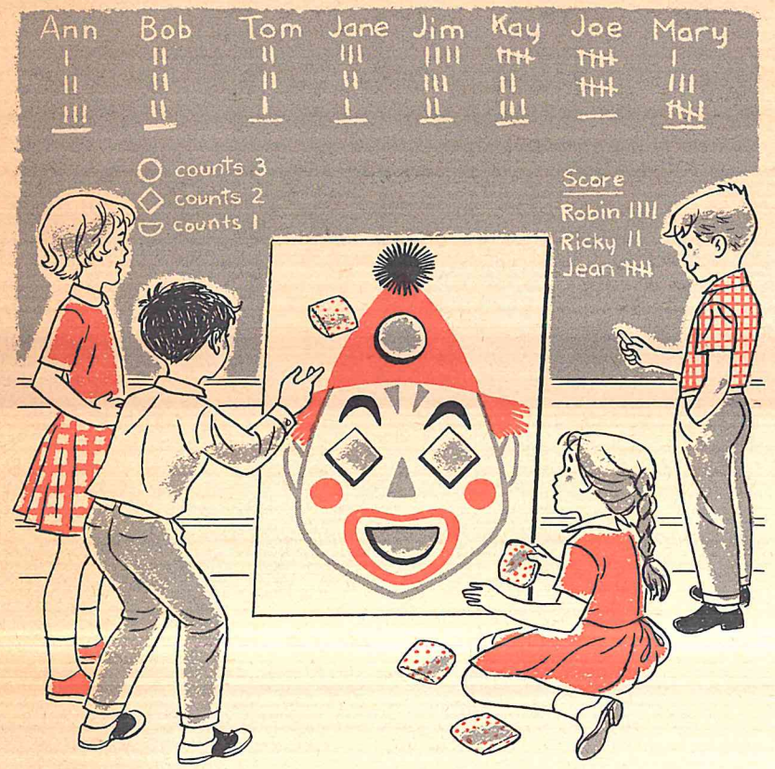
The children might use designs like these on covers for booklets.

Extended Activity

Now I am going to give you an envelope with many colored shapes in it. You may use these shapes to make any design that pleases you. You may then paste the design on white paper.



Make as many designs as you like or have time to do. You may choose one to place on the bulletin board.



6

Purpose

To teach the children to tally.

Vocabulary

Circle, diamond, square, part of a circle, score, tally.

Materials

Several bean bags.

On a piece of heavy cardboard or similar material 24″ x 36″ draw a clown's face like that in the book. Cut out a large circle in the clown's hat; cut out the eyes and mouth.

Developmental Activity

Stand the game board at an angle against the wall. Decide on a distance for the throw line.

Score as follows: a throw through the clown's hat counts as 3 points; through the eye, 2 points; and through the mouth, 1 point.

Write each player's name on the chalkboard. Each child will have 3 throws. Use tally marks to record the score made on each throw.

You may serve as scorekeeper at first. Then choose an able child to keep score. Explain the scoring rules and tallying to the scorekeeper. When he has had several opportunities to record the points, select a new scorekeeper. The scores should be recorded as illustrated on the chalkboard drawn on the pupils' page.

After everyone has had 3 throws, scores should be added and recorded in tally marks. Explain that people used this method of tallying a long time ago to keep a record of how many sheep, cattle, or other things they had or how many they wanted to trade.

On a nice day the board could be placed outdoors, and the scores could be tallied on the playground or blacktop.

Procedure

When the children understand how to tally, have them open their books to page 6. Discuss this page with them. Review the system of scoring.

Do you see the scores on this page? Each child had 2 throws. Look at Robin's score. How many points has she? [4] **With 2 throws, how do you think she made these 4 points?** [She threw bean bags through the eyes twice or through the circle in the hat and through the mouth.]

Discuss Ricky's score. In what 2 ways could he have made it?

Discuss all the ways Jean could have scored 5 points.

Now while the children are enthusiastic about this new game, have them make up oral story problems about their own scores. For example—Mary made a score of 6. How did she do it?

Then have the children work the examples at the top of the page. **These are scores some children made while playing the clown bean bag game. How many turns did Ann have?** [3] **How many turns did Bob and the other children have?** [3] **Let's add their scores as our scorekeeper did. Write each answer as a tally.**

Extended Activity

Read the following problems to the children. Have the children solve them.

1. George threw a bean bag through the clown's diamond-shaped eyes twice. What was his score? Write it as a tally.
2. Harry threw a bean bag through an eye once and through the mouth once. What was his score? Write it as a tally.
3. Bill tossed a bean bag through the circle 2 times. What was his score? Write it as a tally.

(Continued on next page.)

(Continued from page 6.)

4. Each time Marilyn tossed a bean bag, she threw it through a diamond. She had 3 turns. Write her score as a tally. Read it.
5. June had 3 turns. Once the bean bag went through the circle. Once it went through a diamond. On one throw June did not score any points. What was her score? Tally it.
6. Joe had 3 turns, also. Each time he missed the target. Did he have a score? [yes] What was it? [zero]

The class may dictate other problems for you to make into worksheets.

You may change the values for scoring. Larger numbers may be used. Both vertical and horizontal forms of addition may be used in computation.

7

Purpose

To discover that a number has many names.

Vocabulary

Number names.

Materials

A set of 6 counters for each pupil.

Developmental Activity

Boys and girls, almost everyone has more than one name. You may call your mother Mom, Mommie, or Mama. Your father may call her by her first name. She is also called Mrs. Smith or whatever her last name is.

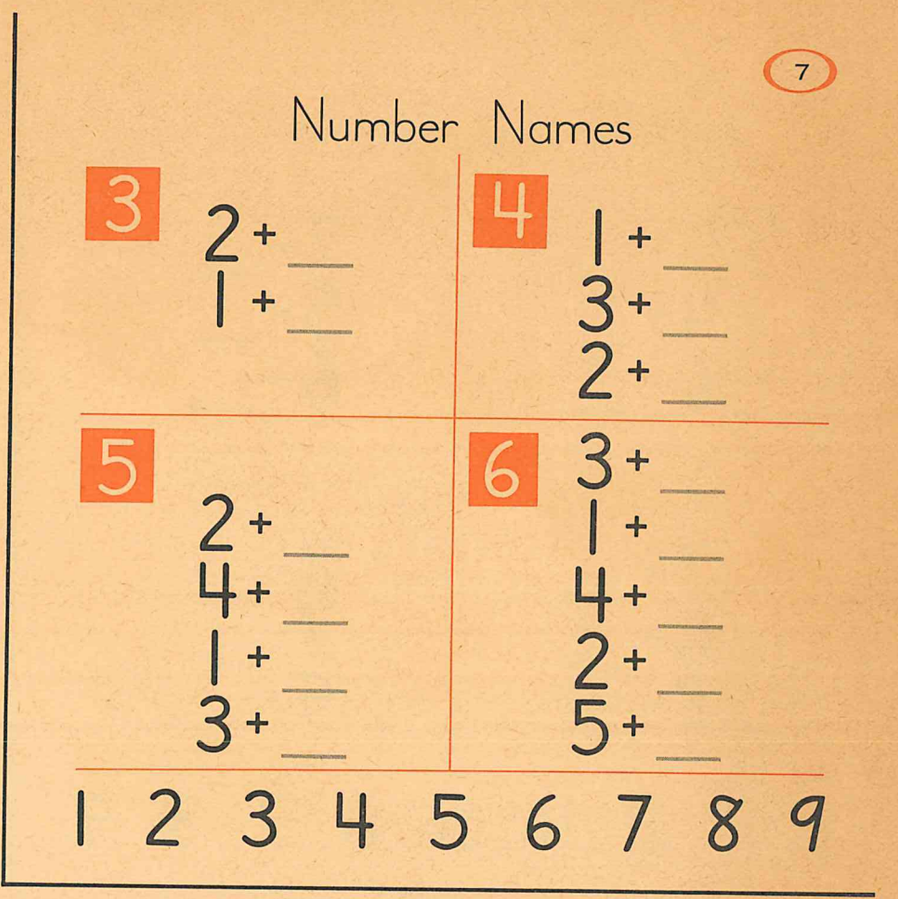
What about names for Father? Let's make a list of them. Elicit from the group a variety of names: Father, Pop, Dad, Daddy, Mr. _____. Write the list on the chalkboard.

Numbers also have many names. Let's see if we can discover some names for 4. Put 4 counters on your desk. Do 3 and 1 make 4? [yes] **Then** $3 + 1$ (write $3 + 1$ on the chalkboard) **is another name for 4.** Repeat for the other addition facts in 4 ($2 + 2$, $1 + 3$). Always have the pupils show the idea with their counters.

Have the children give other names for 5. Write each on the chalkboard as it is given. [$1 + 4$, $3 + 2$, $4 + 1$, $2 + 3$]

What are some other names for 6? [$3 + 3$, $2 + 4$, $4 + 2$, $1 + 5$, $5 + 1$] Develop and write these on the chalkboard.

Write the words "Number Names" on the chalkboard. Have the group read them. Frame each word and have the group read it. **Today we have learned that there are many names for a number.**



Procedure

Open your books to page 7.

What do the two words at the top of the page say? [number names] **Read them as I say them.**

Find the numeral 3 in the left-hand corner at the top of the page. Can we make two other number names for 3? What are they? [$2 + 1$, $1 + 2$] **Write in the missing numerals on the lines.**

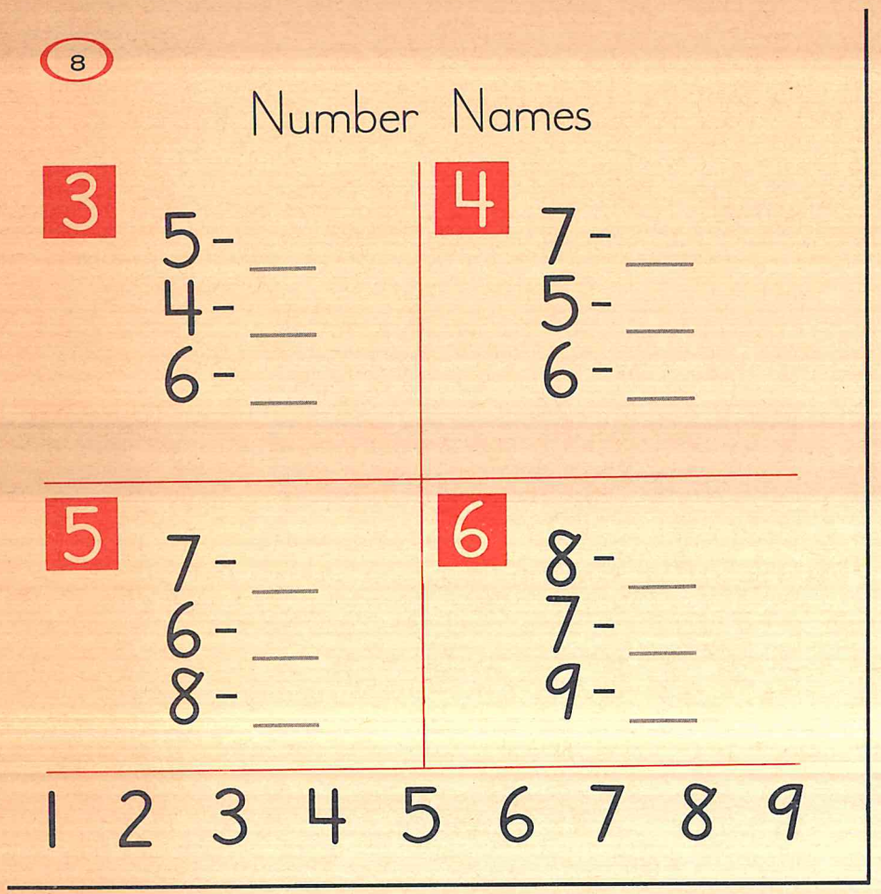
Can you work the rest of the examples? Write good numerals. Are you sitting up tall?

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ sheets of ruled newsprint. Have each pupil put the numeral 5 on one side and the numeral 6 on the other. Then have each pupil write as many other names for 5 and 6 as he can.

Call on children to share their number names with the group.



8

Purpose

To discover different names for a number by using subtraction.

Vocabulary

Number names.

Materials

A set of 9 counters for each pupil.

Developmental Activity

In our last lesson we learned that there are many names for a number. What are two other names for 4? List these on the board. **What are three other names for 5?** List these on the chalkboard.

We have been putting numbers together or adding to give us each of the names. Do you think there is another way to find names for 3? If the idea of subtraction or "take away" is not mentioned, write 5 — 2 on the chalkboard. Discuss. Lead the children to see that this is another name for 3. Another name for 3 is any two numbers which when subtracted give an answer of 3. There are an infinite number of possibilities.

We will use subtraction to write other names for 3. What other names for 3 can we write? [4 — 1, 6 — 3, 7 — 4] There is no limit to the number of correct answers. Some pupils may suggest very large numbers as names for 3. Encourage this to the extent that group interest and understanding indicate.

Can we write three number names for 4, using subtraction? List them on the chalkboard. Discuss as necessary. Have the pupils use their counters to show that the examples are correct. Repeat this procedure for 5 and 6.

Today we have learned that we can also use subtraction to name numbers.

Procedure

Open your books to page 8.

Who can read the two words at the top of the page? [number names] **Now let's all read them as I point to them.**

Find the numeral 3 in the colored box. Can we make another name for 3 with the numerals 5, 4, and 6? What numeral should we use with 5? [2] **Five take away 2 leaves 3.**

Let us read the numerals at the bottom of the page. These have been written here to help us make good numerals. Let's trace each numeral with a pencil. Do this several times if the group needs this practice.

Now write the missing numeral in each example. Raise your hand if you want help. Write good numerals.

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ sheets of ruled newsprint. Have each pupil put the numeral 5 on one side and the numeral 6 on the other. Then have each pupil write as many other names for 5 and 6 as he can. He may use both addition and subtraction.

Have the children share these number names with the group.

9

Purpose

To introduce frames and to review the 15 addition facts through 6.

Vocabulary

Frame, frames.

Developmental Activity

Put a set of addition examples on the chalkboard, located so that pupils can write in the answers. Draw a line after each example for the answer.

$3+1=\_\_$	$2+2=\_\_$
$2+4=\_\_$	$1+4=\_\_$
$1+5=\_\_$	$4+2=\_\_$

Call various pupils to the chalkboard to work the examples. **Boys and girls, how did you know where to write the answer?**

Draw a frame around the first answer. **Do you remember what we call this?** [frame] Then call on pupils to draw a frame around each answer, using the horizontal line as the base of the frame.

What do you think this would mean: $3 + 3 = \square$? Discuss.

Let's work some examples of this kind. Put the following set of addition examples on the chalkboard:

$3+3=\square$	$2+2=\square$
$2+1=\square$	$5+1=\square$
$3+2=\square$	$4+2=\square$

Have the pupils take turns writing the answers in the frames.

Procedure

Open your books to page 9.

Look at example number 1. What numeral goes in the frame? [4]

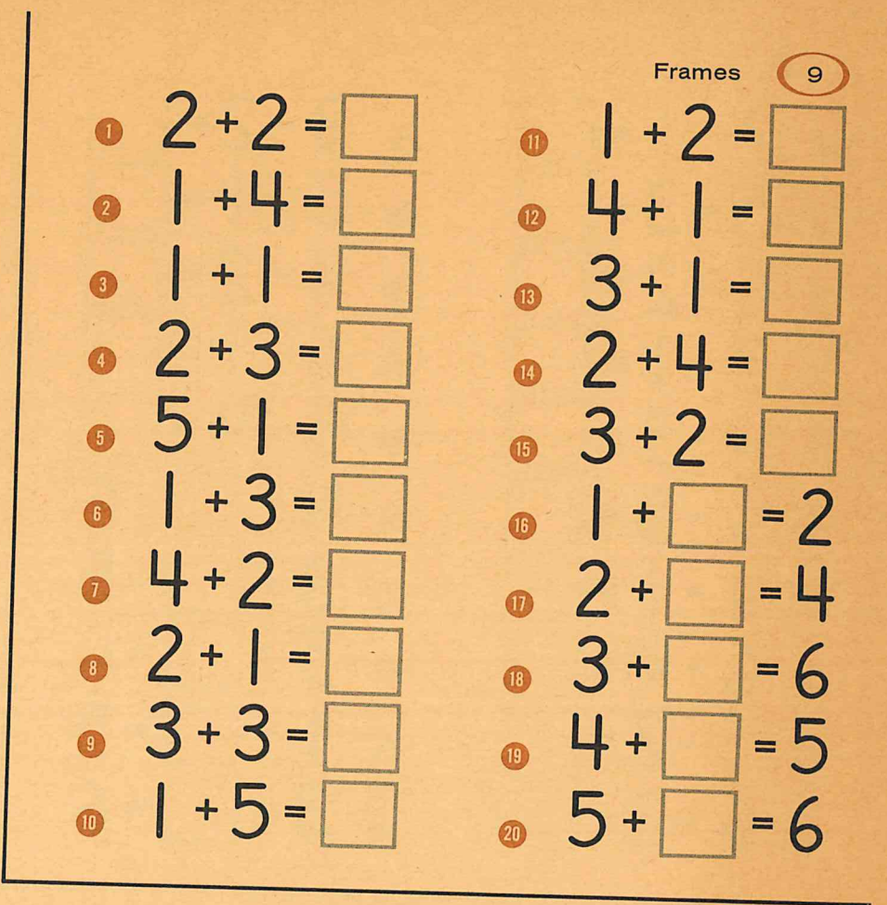
What numeral goes in the frame for example number 2? [5]

Do you think you can work the rest? These are easy. Work carefully. Make good numerals. Use counters to help find the answers you don't know.

Circulate and help as needed.

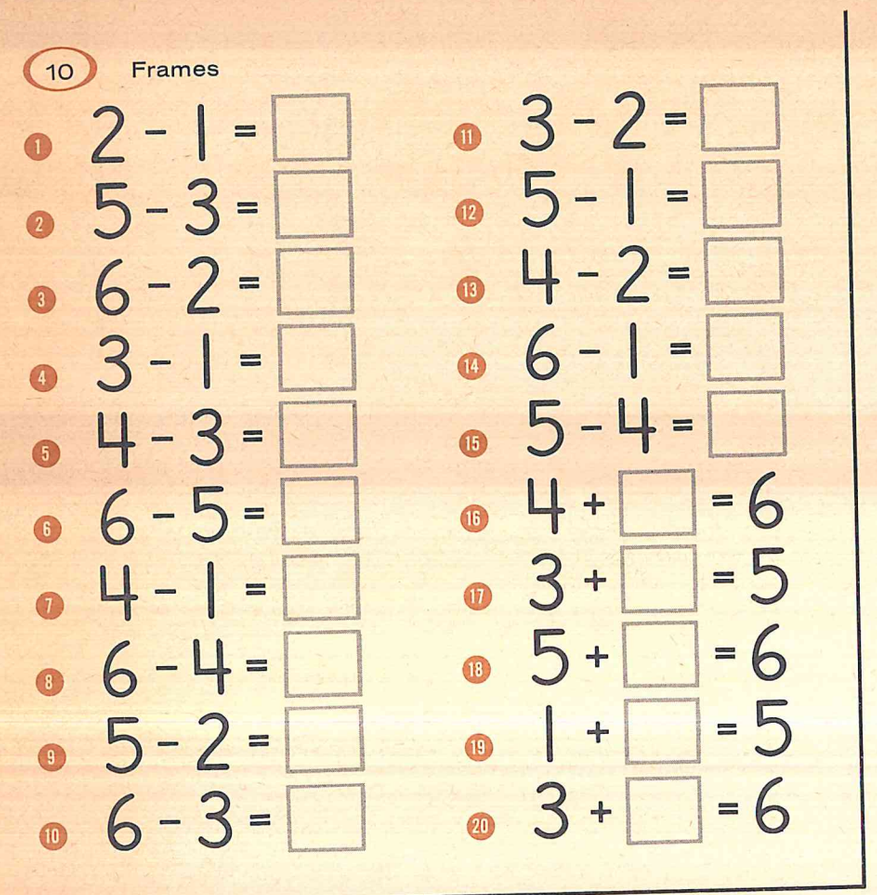
Extended Activity

Put this set of addition examples on the chalkboard:



$4+\square=6$	$\square+2=4$
$3+\square=5$	$\square+4=5$
$\square+1=4$	$3+\square=4$
$\square+3=6$	$5+\square=6$
$2+\square=5$	$\square+2=5$
$1+\square=4$	$\square+1=6$

Have the pupils copy the examples on ruled 6″ x 9″ newsprint and write in the answers. Then have the group orally repeat the answer to each example. The first example is read: "Four and frame are six."



10

Purpose

To extend the use of frames and to review the 15 subtraction facts through 6.

Vocabulary

Frame.

Developmental Activity

Put a set of subtraction examples on the chalkboard. Locate them so that pupils can write in the answers. Draw frames for the answers.

$5 - 2 = \square$ $\quad$ $3 - 1 = \square$
$6 - 1 = \square$ $\quad$ $5 - 1 = \square$
$4 - 3 = \square$ $\quad$ $6 - 2 = \square$

Give the children practice in reading these examples orally. $5 - 2 = \square$ is read as: "Five take away two leaves frame." Point to the frame. **Boys and girls, when we see an empty frame what do we know?** [There is a numeral missing.]

Have pupils take turns coming to the board and writing in the missing numerals.

Procedure

Open your books to page 10.

What numeral is missing in example number 1? [1] **What numeral is missing in example number 2?** [2]

Write the missing numeral in each frame.

Are we sitting up tall?

Circulate and help as needed.

Extended Activity

Put this set of subtraction examples on the chalkboard. First, have the group work the examples orally. Then have them copy the examples on 6″ x 9″ ruled newsprint and write in the answers.

$5 - \square = 4$ $\quad$ $4 - \square = 3$
$3 - \square = 1$ $\quad$ $6 - \square = 2$
$6 - \square = 3$ $\quad$ $5 - \square = 2$
$4 - \square = 2$ $\quad$ $4 - \square = 1$
$5 - \square = 3$ $\quad$ $6 - \square = 5$

11

Purpose

To introduce the symbol > (greater than or more than).

Vocabulary

More than.

Developmental Activity

Boys and girls, today we are going to learn a new arithmetic symbol. We already know how to make symbols or numerals that tell how many. Who can write some of these symbols on the chalkboard?

We also know some symbols for addition and subtraction. What are they? [+, −] **The words "add" and "subtract" are also symbols.**

Does anyone know a symbol for cent or cents? [¢]

Write on the chalkboard: 4 > 1. **Does anyone know how to read this?** If there are no responses, tell the children: "Four is more than one." **This symbol** (point to it) **means more than.**

I will write some of these on the chalkboard. Can you read them? Write on the chalkboard: > means more than.

Then write:

5 > 2	14 > 5
7 > 6	17 > 12

Have pupils take turns reading the statements. Then have individual pupils write statements on the chalkboard and have others read them. Continue until the group shows understanding.

Procedure

Open your books to page 11.

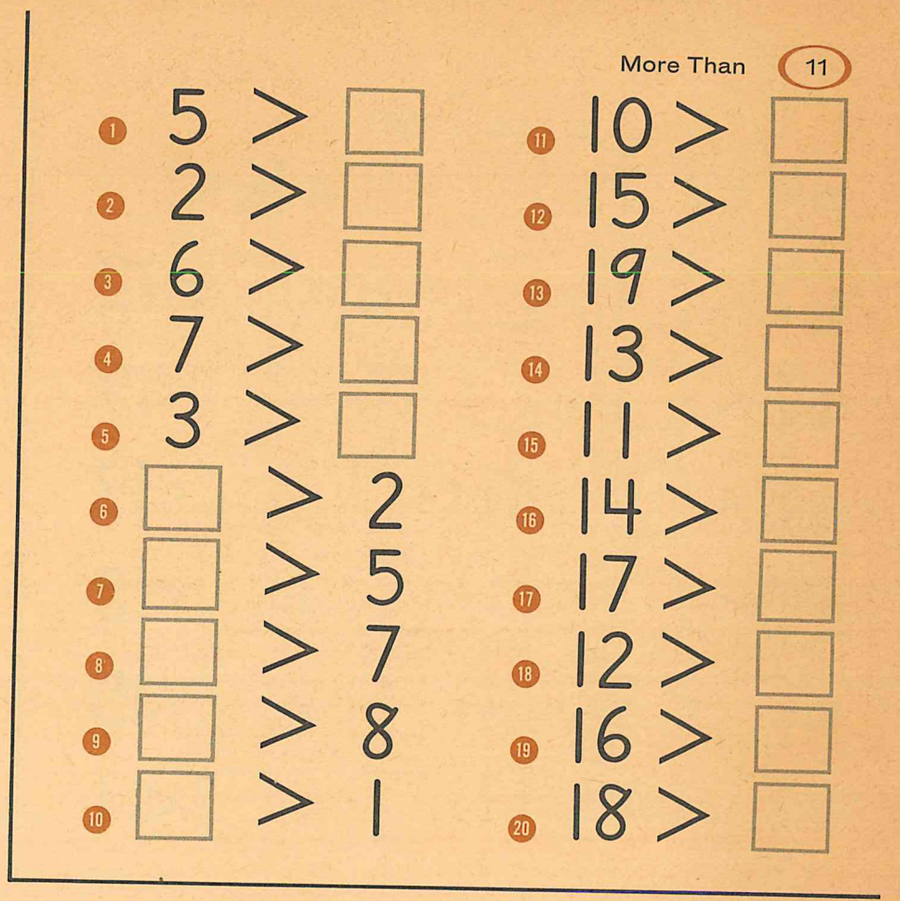
Who can read the two words at the top of the page? [more than] **Let's all frame them. What do they say?**

Now look at the first example. Who can read it? [5 is more than frame.] **What are some of the answers we can put in the frame?** [4, 3, 2, 1, 0] **There are many correct answers. Write one of them.**

Who can read example number 2? [2 is more than frame.] **What is a correct answer?** [1, 0]

How do we read example number 6? [Frame is more than 2.] **What are some answers we might write?** [any number which is more than 2] **Can we write an answer for each of the others? Raise your hand if you want help.**

Circulate and check the children's work.



Some pupils may discover they can put 0 or 1 in almost every frame. Encourage them to give a variety of answers.

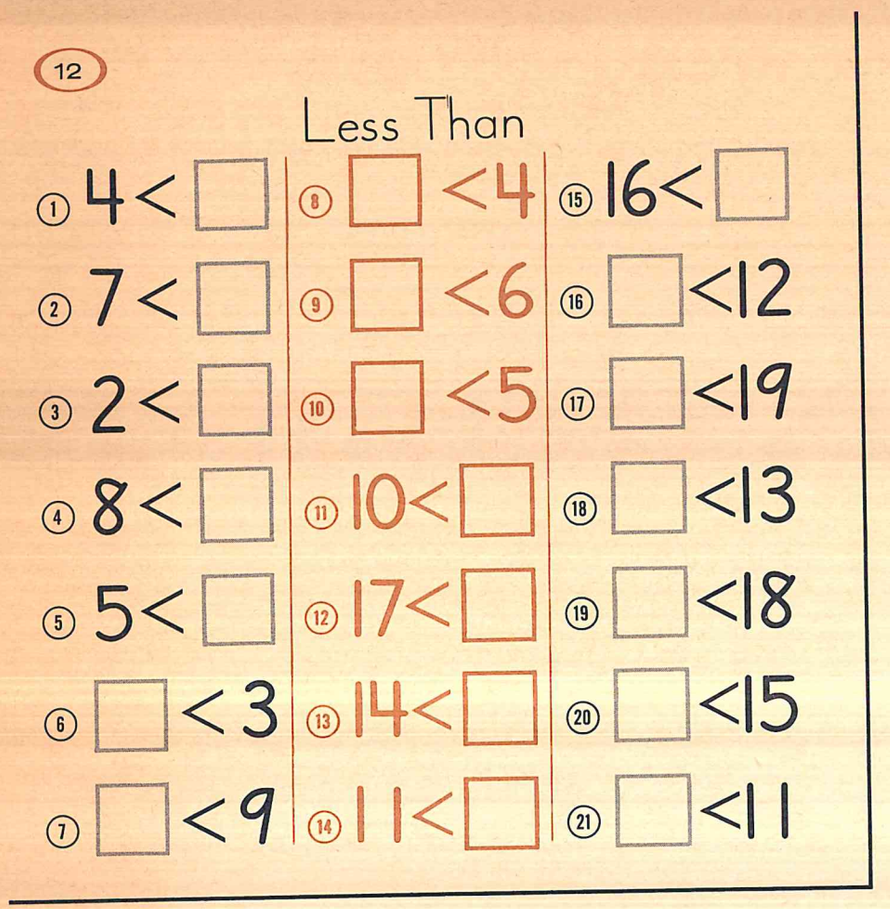
When the group has finished, have the children share their answers and discuss them. For instance, in problem 1, any of five numerals may be put in the frame. All five of the numerals make up the "set of answers" or the "solution set" to this example. (Do not use the term "solution set" with the children.)

Extended Activity

Copy the following set of examples on the chalkboard:

7 > □	□ > 11
12 > □	□ > 16
19 > □	8 > □
□ > 5	13 > □

Pass 9″ x 12″ ruled newsprint to the group. Read the first example with the children. Then have them copy and work each example.



12

Purpose

To introduce the symbol < (smaller than or less than).

Vocabulary

Opposite. Less than.

Developmental Activity

We are going to learn another arithmetic symbol or sign. This sign is the opposite of the one we learned in our last lesson. Who can show us the sign or symbol for more than? [>] **What would the opposite of more than be?** [less than] **Our new sign is < and we read it "less than." Put < and "less than" on the chalkboard. Who thinks he can read this statement: 5 < 7?**

Put the following on the chalkboard:

2 < 4	17 < 19
7 < 9	12 < 15

Have pupils take turns reading the statements. Then have pupils put statements on the chalkboard and have others read them. Continue until the group shows a good understanding.

Procedure

Who can read the words at the top of the page? [less than] **Let's all frame them with our hands. What do they say?**

Now look at the first example. Who can read it? [4 is less than frame.] **What are some of the answers we can write in the frame?** [5, 6, 7, 8, 9,—any number which is more than 4] **Write in a correct answer.**

Who can read example number 2? [7 is less than frame.] **What is a correct answer?** [any number more than 7]

Who can read example number 6? [Frame is less than 3.] **What answers can we write in the frame?** [0, 1, 2]

Can we write an answer for each of the others? Raise your hand if you want help.

Circulate and give help as needed. Check each pupil's work.

Some pupils may use this lesson to show that they know how to write two-place and three-place numerals. Variety is encouraged. When the group has finished, have various children read their answers. There is a set of answers for each example.

Extended Activity

Copy this set of examples on the chalkboard:

6 < □	□ < 13
9 < □	□ < 19
14 < □	□ < 16
□ < 6	8 < □

Read the first example with the group. Then have the children copy and work each example.

13

Purpose

To help children learn the sequence of the days of the week. To teach them to write the names of the days of the week. To associate each day with some satisfying experience. To see the value of planning.

> You should be alert to opportunities to relate calendar study to everyday living.
>
> A discussion of a large commercial calendar may lead in many directions. Restrict the discussion to one major idea. For example, at this time stress only those learnings related to the days of the week.

(Continued on next page.)

(Continued from page 12.)

Vocabulary

Week, seven days, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, weekend, weekday, first day, last day, middle of the week, school week.

Materials

A large commercial calendar; tagboard or newsprint to make other types of calendars.

Developmental Activity

Show the large calendar. Help the children see that the days of the week follow in order.

Since Sunday (the first day of the week) and Saturday are spent with parents, the discussion may be centered for a time on how different families spend their weekends. For the days spent in school, the children may be guided to help plan what they consider highlights of the week.

Draw a line on the chalkboard and divide it into seven parts. Write the name of one day of the week above each part. Discuss and agree on what activity should be listed for each day. The following may serve as a guide:

HIGHLIGHTS OF OUR WEEK

Sept. 18	Sept. 19	Sept. 20	Sept. 21			
Sunday	Monday	Tuesday	Wednesday			
We had fun.	We saw a movie.	We planned for our play.	We finished our big book.			

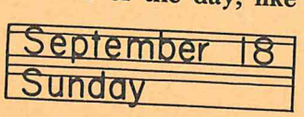
This activity is important enough to repeat frequently and may be used as a handwriting lesson.

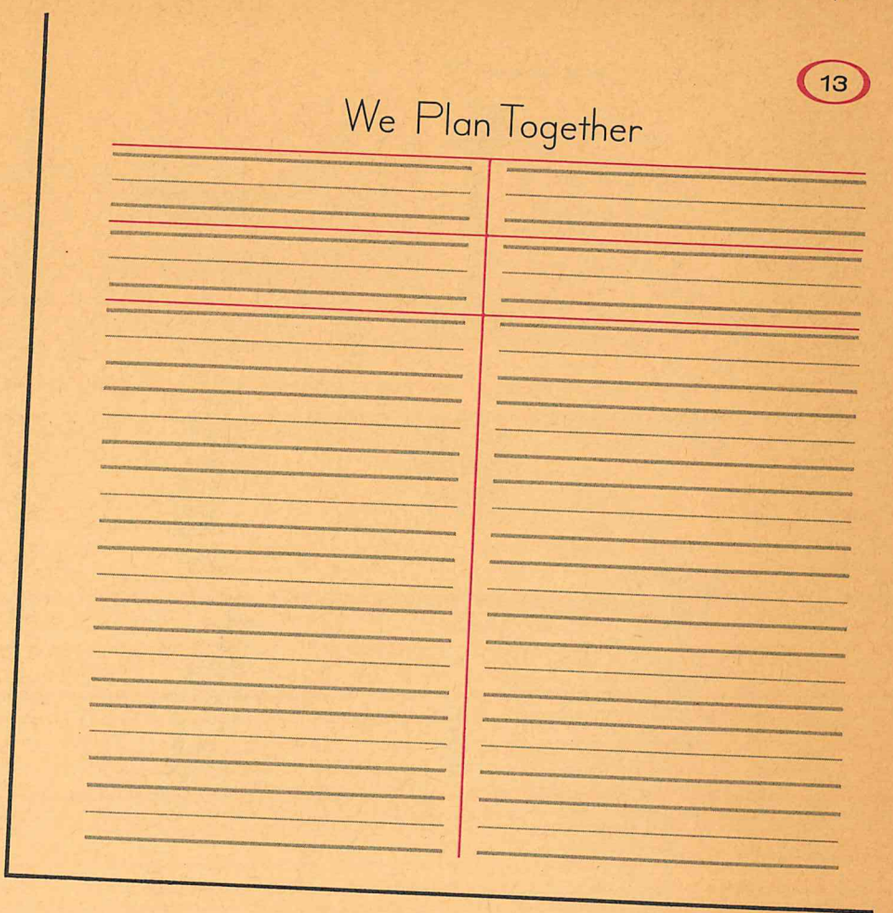
When the children participate in planning for the week or for the day, they become aware that they share some responsibility for the success or failure of the planned activity.

Procedure

Let us open our books to page 13. Here we find a page which is almost blank. It looks as if we are expected to do something here. This may take us several days to do it well. Our arithmetic lesson today is going to become a handwriting lesson. Since we have been writing our plans on the chalkboard all week, this should be easy.

In the top space in the first column we will write the name of the month and the number of the day. In the space below it, we will write the name of the day, like this:





In the next space we will start a short sentence that tells what most of us did on Sunday. Who has a good idea?

The chart in the pupils' book has room for only two days. A similar chart with seven columns may be prepared for use in class.

Continue this pattern for as long as interest is maintained for one lesson. This may be a relatively short time. Continue the next day.

Be alert to all factors that contribute to a good handwriting lesson.

Extended Activity

Pass out sheets of 9″ x 12″ ruled newsprint. On one side have the children write the numeral 5, on the other side, the numeral 6.

Write 10 other names for each of these numbers. Be neat!

Evaluate as a group. **What are some of the interesting answers?**

14 What Do These Measure?

14

Purpose

To determine whether children can identify certain measuring devices and tell what each measures.

Vocabulary

Measure, inches, feet, time, calendar, tape measure, scales, pounds, weight, liquid, dry, cold, hot, clock, thermometer, teaspoon, location.

Procedure

The children have had experiences with many types of measurement. This lesson serves as a review.

Open your books to page 14.

Today we are going to do two pages. We are going to name the object in each box and tell what it measures.

Begin with the first box in the first row. Who can tell me what this is? [calendar] **Who can tell me what a calendar measures?**

What is the object in the second box in the first row? [scales] **Who can tell what the scales measure?**

Now look at the last box in the first row. What is the object here? [tape measure] **What does a tape measure measure?**

Now look at the first thing in the second row. What is it? [scales] **What does it measure? Where would you see a scales like this? How is it different from the other scales on this page?**

Look at the second object in the second row. What is it? [measuring cup] **What does a measuring cup measure?**

Look at the last box in the second row. What is in it? [thermometer] **What does a thermometer measure?**

What is in the first box in the last row? [ruler] **What can we measure with a ruler? Read the numerals on the ruler. They go to 12. This means there are 12 inches on this ruler.**

Look at the second box in the last row. What is in this box? [milk bottle] **What are the letters on the bottle?** [qt.] **Qt. is a short way for writing quart. What does the milk bottle measure?**

What is in the last box in the last row? [a watch] **What does a watch measure?**

(Continued on next page.)

(Continued from page 14.)

On the next page look at the first box in the first row. What is in it? [clock] **What does a clock measure?**

Who would like to say something about the next picture? Where would you see a speedometer? Who can remember what a speedometer measures?

The last picture in the first row is a _____. [thermometer] **What does a thermometer measure? Is this thermometer like the one on the other page? How is it different?**

Does anyone know what the first object in the second row is? [gasoline pump] **What does a gasoline pump measure?**

Find the measuring spoon. What does it measure?

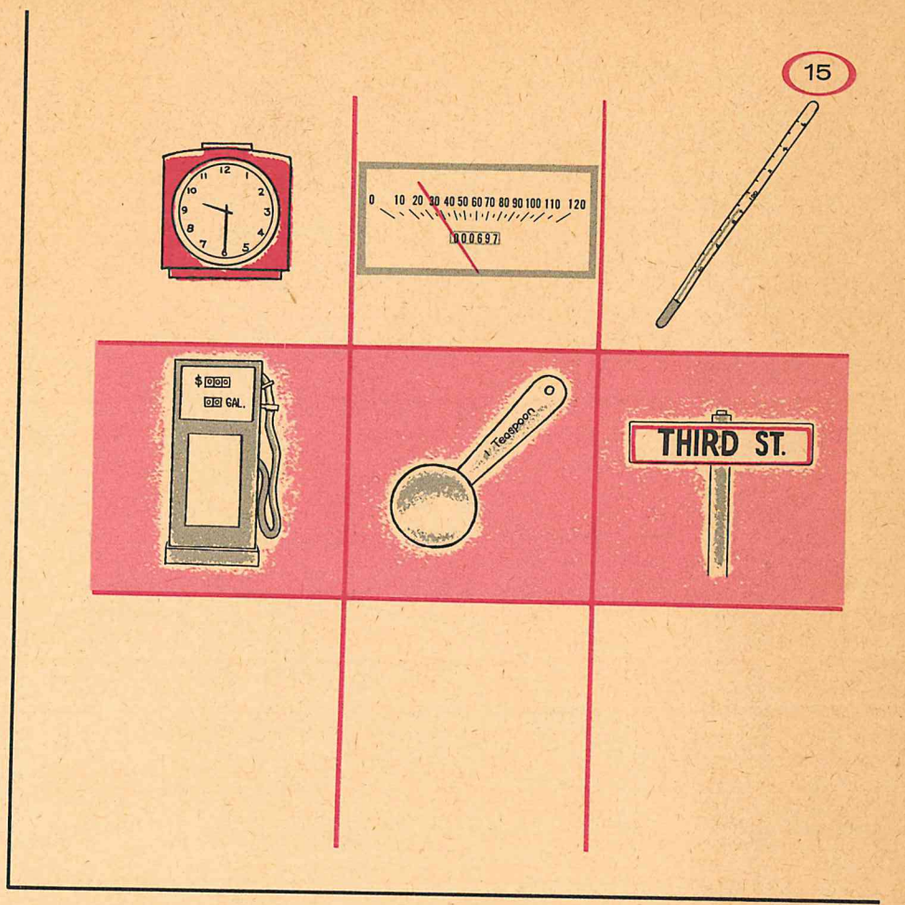
Look at the signpost. What does the signpost tell us? [location]

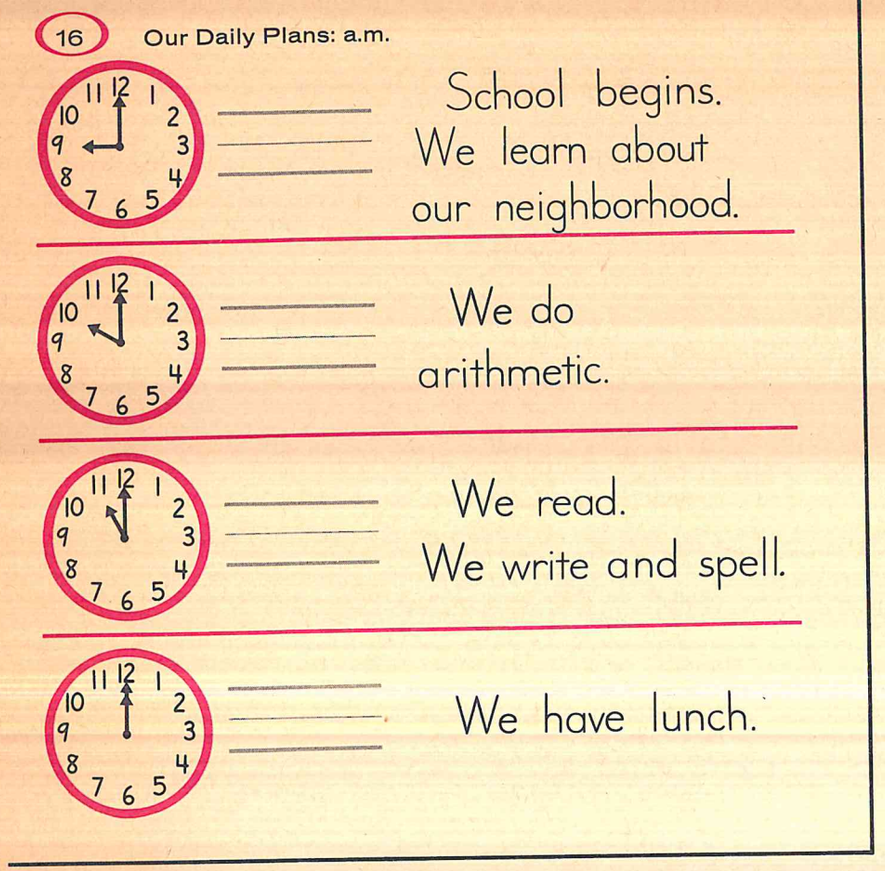
Extended Activity

Have pupils in groups of three or four find circles, squares, and rectangles in old magazines. Materials needed for each group: 24″ x 36″ sheet of newsprint, old magazines, scissors, and paste.

Have pupils find things that represent these three basic shapes in magazine pictures. Cut them out and paste them on the large sheet.

Evaluate as a group.





16 17

At the second grade level understanding the term time implies much more than having the ability to read a clock on the hour or half hour. It also includes having the ability to read minutes; understanding the meaning of "a.m." and "p.m."; recognizing the days of the month, the names of the months, the order and names of the seasons; and knowing how many months and days there are in a year. To make these learnings meaningful you will wish to relate instruction to the children's experiences both in and out of school. In this book each of the above categories is developed separately, beginning with a review of reading the clock on the hour and on the half hour.

Purpose

To assess the abilities of individual children to read the clock on the hour; to develop understanding of the meaning of a.m. and p.m.; and to learn to write the time symbols for a given hour.

Vocabulary

Long hand, short hand, hour, half hour, half past, minutes, minute hand, morning (a.m.), noon, evening, afternoon (p.m.), night, until, after, day.

Materials

A discarded alarm clock, a toy clock, paper plates, tagboard or butcher paper, a felt-tipped pen.

Developmental Activity

While most educators agree that flexibility in the daily schedule is highly desirable, children like a reasonable amount of orderliness and routine in their living. Discussing the daily plans for living and working together at the beginning of the year is one good way to begin a study of time. These daily plans will vary from school to school, depending not only upon the content taught but also upon the length of the school day.

Discuss the kinds of school experiences that occur on the hour. Record these on the chalkboard along with the appropriate hour. Have various children read the activity and the time while other children show the time on the movable clock.

Make a large chart similar to these pages in the pupils' edition. (Omit the lines next to each clock.) From paper plates have the children make clocks with movable hands. Fasten several of these to the chart. The daily activities may be listed on removable cards to give flexibility in the use of the chart.

It is recommended that you develop this lesson working with small groups of children.

Those who read well and have the ability to follow directions will need little guidance and can work quite independently. Children with less reading ability can still get the mathematical learnings through group discussion.

When this developmental chart (daily program chart) is available, use the book pages 16 and 17.

Procedure

Open your books to page 16.

What do we have in our room that reminds you of this page? [our daily program chart] **How is our chart like this page? How is it different?**

(Continued on next page.)

(Continued from page 16.)

What is the title of this page? Do you remember what a.m. means? What part of our schoolday is this page about?

Point to the first clock. **What time does it show? Who can read what happens at 9 o'clock? Is this something that happens at 9 o'clock in the morning or at 9 o'clock in the evening? We write 9 o'clock in the morning like this: 9:00 a.m.** (Write "9:00 a.m." on the chalkboard.) **Let's write 9:00 a.m. on the lines next to the first clock.**

Who can read the words near the second clock? What time does this clock show? [10 o'clock] **How do we write 10 o'clock in the morning?** [10:00 a.m.] **Write 10:00 a.m. on the lines.**

Use a similar procedure to complete page 16.

Now let's look at page 17. Is the title of this page the same as the title for page 16? What is different? [p.m.] **What do you think "p.m." means?**

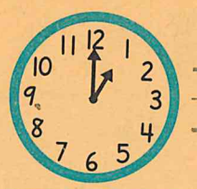
Page 16 is about school activities which take place in the morning. What is page 17 about? What is the symbol for afternoon?

What does the first clock say? [1 o'clock] **What does the sentence by it say? What should we write to show 1 o'clock in the afternoon?** [1:00 p.m.] Write "1:00 p.m." on the chalkboard. Have the children write it in their books.

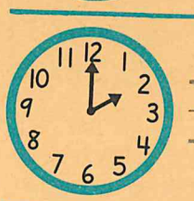
Finish the page by working in the same fashion.

Extended Activity

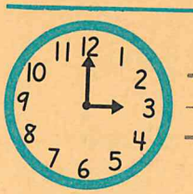
Give the children worksheets of clockfaces without hands. Indicate the time below each clockface in this form: 9:00 a.m.; 1:00 p.m.; etc. Ask the children to make each clock show the time written beneath it.



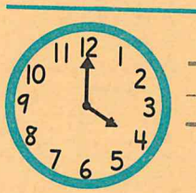
We have music, stories, and records.



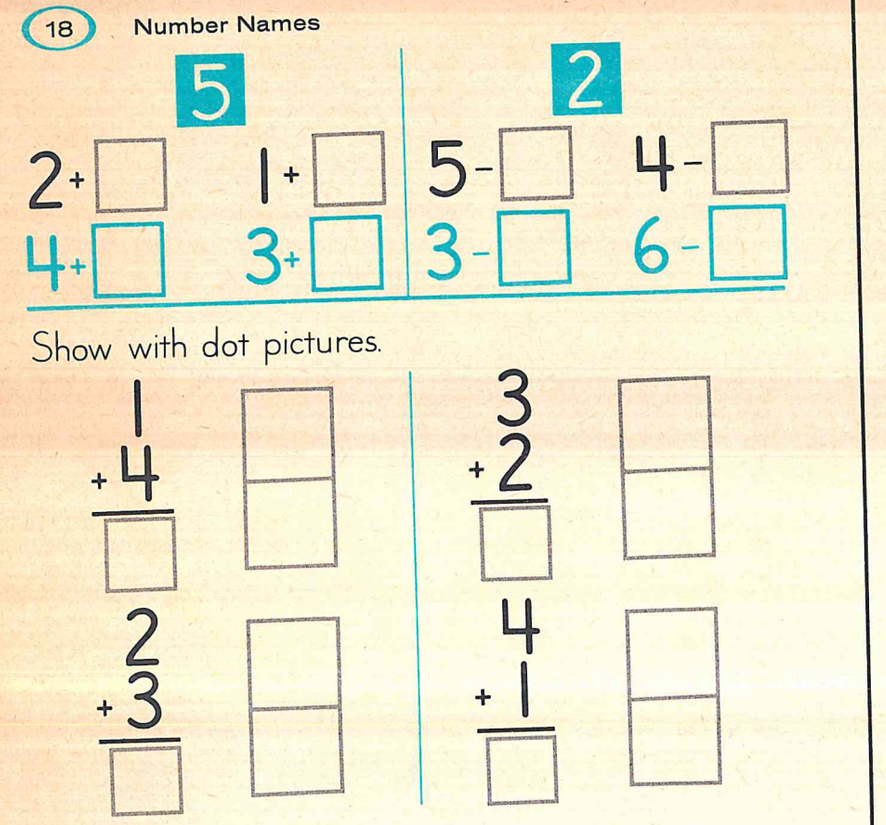
We do experiments.



We go home.



We play outdoors.



18

Purpose

To review the addition facts in 5, using frames, number names, and dot pictures.

Vocabulary

Addition, subtraction.

Developmental Activity

Copy the addition examples from the top of the page on the chalkboard. Place them so that children can write in the answers.

What is missing in each frame? [a numeral] **Who can write in the numeral for the first example?** [3] Have children complete each example.

These are addition examples. Write "addition" on the chalkboard. **Let's all read the word addition. What does addition mean?**

Copy the subtraction examples from this page on the chalkboard.

Look at this set of examples. What kind of examples are they? [take away, subtraction] **This is how we write subtraction.** Write "subtraction" on the chalkboard. **Let's read it together. Again.**

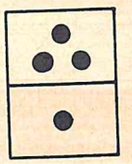
What does subtraction mean?

Who can write in the numeral in the first example? [3] Repeat this until all examples are completed.

Do you remember how to make dot pictures for examples? Put the following on the chalkboard:

$$\begin{array}{r} 3 \\ +\ 1 \\ \hline \end{array}$$

Fill in the domino to show 3 and 1.



Procedure

Open your books to page 18.

Look at the top part of the page. In the first box we need to make four number names for 5 by using addition.

In the next box, what must we do? [Make number names for 2 by using subtraction.]

What are we to do on the bottom part of the page? [Show with dot pictures.] **Write the answer to each example and then show what the example means with dot pictures.**

Extended Activity

If possible obtain several sets of double six dominoes and teach the children how to play. Have groups of four play dominoes. This is excellent practice in learning to see and compare groups through six.

19

Purpose

To review the addition facts in 6, using frames, number names, and dot pictures.

Vocabulary

Addition, subtraction.

Developmental Activity

Copy the examples from the left top part of page 19 on the chalkboard so that pupils can write in the answers.

Boys and girls, what is missing in each of the frames? [a numeral]

Who can work one of the examples? Repeat until all are completed.

These examples are all addition. Write the word "addition" on the chalkboard. **Let's all read it together—addition.**

Copy the other examples from the top of the page on the board.

Now look at the next set of examples. What kind of examples are they? [subtraction] Write the word "subtraction" on the chalkboard. **How do we know these are subtraction examples?** [The sign tells us.]

Who can do the first example? Repeat until all are completed.

Procedure

Open your books to page 19.

Look at the top part of the page. In the first box we will make five number names for 6. Will we use addition or subtraction? [addition]

What are we to do in the second box? [Write 5 subtraction names for 1.]

Write the answers to the examples at the bottom of the page. Then make the dot pictures.

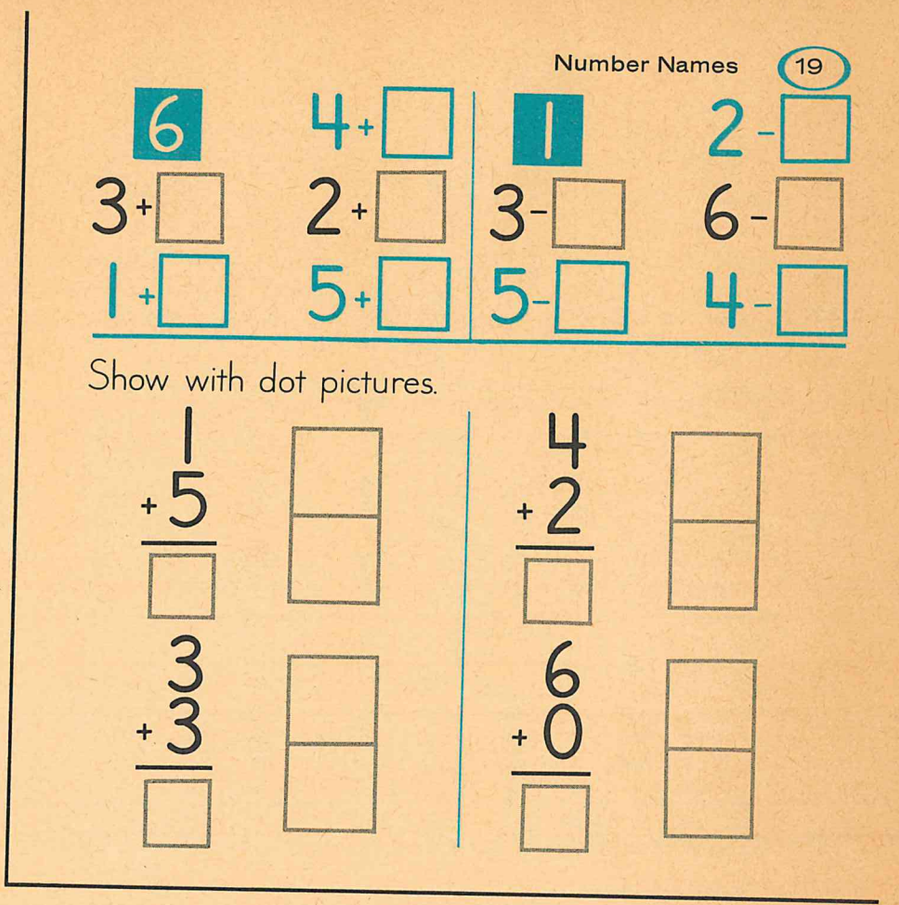
Work carefully. Are we sitting tall?

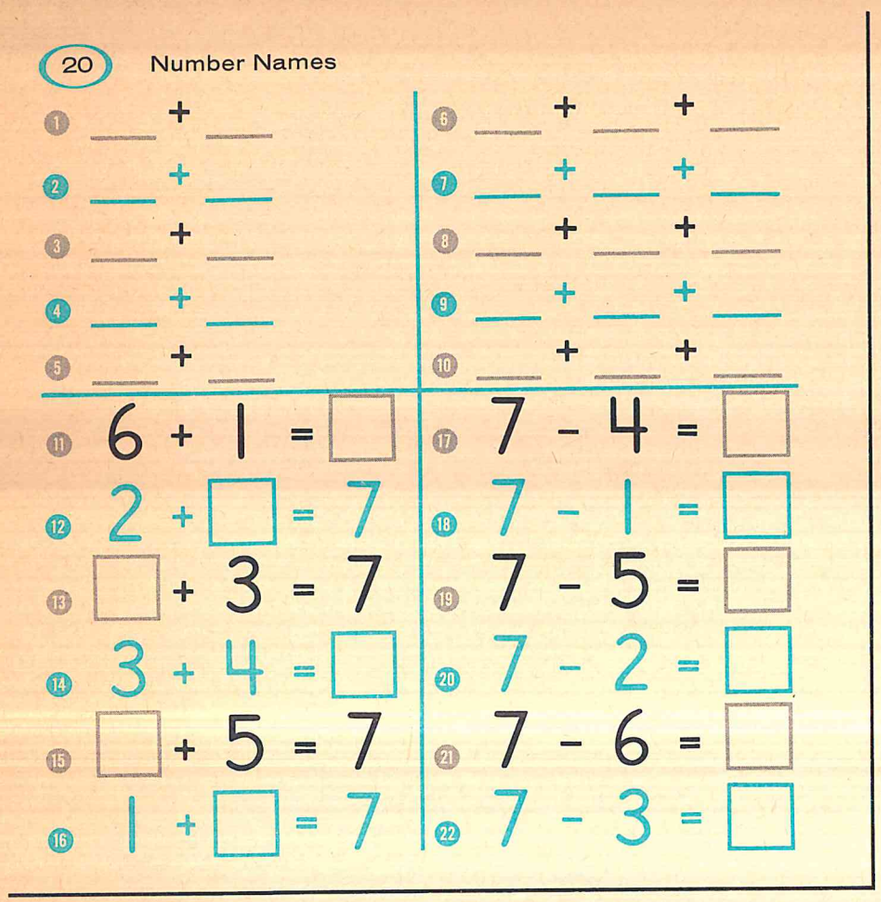
Circulate and give help as needed.

Extended Activity

Have groups of four children play dominoes with a double six set. Observe the games and assist if needed.

The ability to see numbers as groups is important to success with the addition and subtraction facts.





20

Purpose

To review the addition and subtraction facts in 7 with number names and frames.

Vocabulary

Addition.

Developmental Activity

Write the word "addition" on the chalkboard. **Class, what does this word say?** [addition] **Today we are going to see how many addition names we can make for 7.** Have the group give the six addition facts for 7. Put six sets of ___ + ___ on the chalkboard so that pupils can write in the numerals.

I think we are ready to try some harder ones now. Shall we? We can use more than two numerals to write another name for a number. Put on the chalkboard: ___ + ___ + ___. **Can we make another name for 7 that will go on these lines?**

There are over 25 other names for 7 using addition. Some are:

2 + 2 + 3	3 + 3 + 1
2 + 3 + 2	1 + 3 + 3
3 + 2 + 2	3 + 1 + 3
4 + 1 + 2	5 + 1 + 1
4 + 2 + 1	1 + 5 + 1
1 + 4 + 2	1 + 1 + 5

Elicit a variety of number names for 7 from the children. List them on the chalkboard.

In this activity it is important that children use the same numerals several times in different order. Encourage them to do so.

A set of numerals including zero may not be given by a pupil. **There is another kind of example that we haven't used. Who can think of it?** If zero is not suggested, write a zero on the chalkboard. **Can we use zero in any of the names?** Many solutions will result:

4 + 3 + 0	2 + 5 + 0
0 + 4 + 3	2 + 0 + 5

At this point encourage such a generalization on the part of pupils as: "Adding zero doesn't change the answer."

Procedure

Open your books to page 20.

At the top of the page you are to write 10 addition names for 7. These examples are just like the ones we have been working. Go ahead and work them.

Then do the examples at the bottom of the page. Write the missing numerals in the frames.

Raise your hand if you need help.

Extended Activity

Pass out ruled 6″ x 9″ newsprint. **Make as many names for 7 as you can with three numerals.**

A careful evaluation of this lesson should be made. Over 25 correct solutions are possible.

21

Purpose

To understand that the numerals 1 through 99 are developed in an organized pattern.

Vocabulary

Number, numeral, teen family, twenty family, thirty.

Materials

Tagboard for making chart, pockets, strips, pocket chart, lettering pen.

Developmental Activity

As advance preparation for this lesson, have a large chart of tagboard squared. Make 2 strips of numerals. Have one strip list the numerals vertically in sequence from 1 to 9. The other will list them horizontally. Make similar strips to complete the chart. The strips may be clipped to each end of the large sheet of tagboard.

With the children develop the teen family. Use the strip that has the numerals in vertical sequence and the one that has them in horizontal sequence. These strips may be clipped to the charts.

In a similar manner the other families may be developed. Judge how many families can be developed at one time with your group. Do enough in one lesson so that the children will get the pattern of the families.

When the charts are completely developed, they should look like those in the children's books.

Procedure

Open your books to page 21.

There are 2 charts on this page. One looks like our hundred chart.

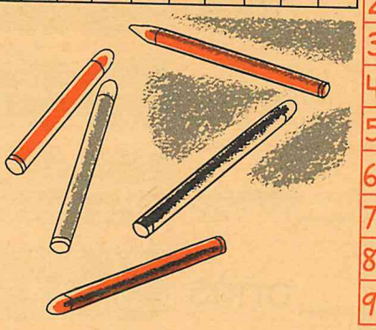
In the chart at the top of the page, put a blue X on all the numerals from 1 to 9. Now find the numerals from 1 to 9 on the second chart. Put an X on these.

Now go back to the first chart. Say the teen numbers. Put a red dot on each of these numerals as you say it. Who can be the first to locate the teen family on the second chart? Again put a red dot on each teen numeral as you say it.

Return to the first chart. Mark all the numerals in the twenty family with green X's. Say these numbers. Find the twenty family on the second chart. Mark each numeral with an X as you say it.

Continue using a similar pattern with the other families until the children have recognized all of them through the nineties.

	10	20	30	40	50	60	70	80	90
1	11	21	31	41	51	61	71	81	91
2	12	22	32	42	52	62	72	82	92
3	13	23	33	43	53	63	73	83	93
4	14	24	34	44	54	64	74	84	94
5	15	25	35	45	55	65	75	85	95
6	16	26	36	46	56	66	76	86	96
7	17	27	37	47	57	67	77	87	97
8	18	28	38	48	58	68	78	88	98
9	19	29	39	49	59	69	79	89	99



	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

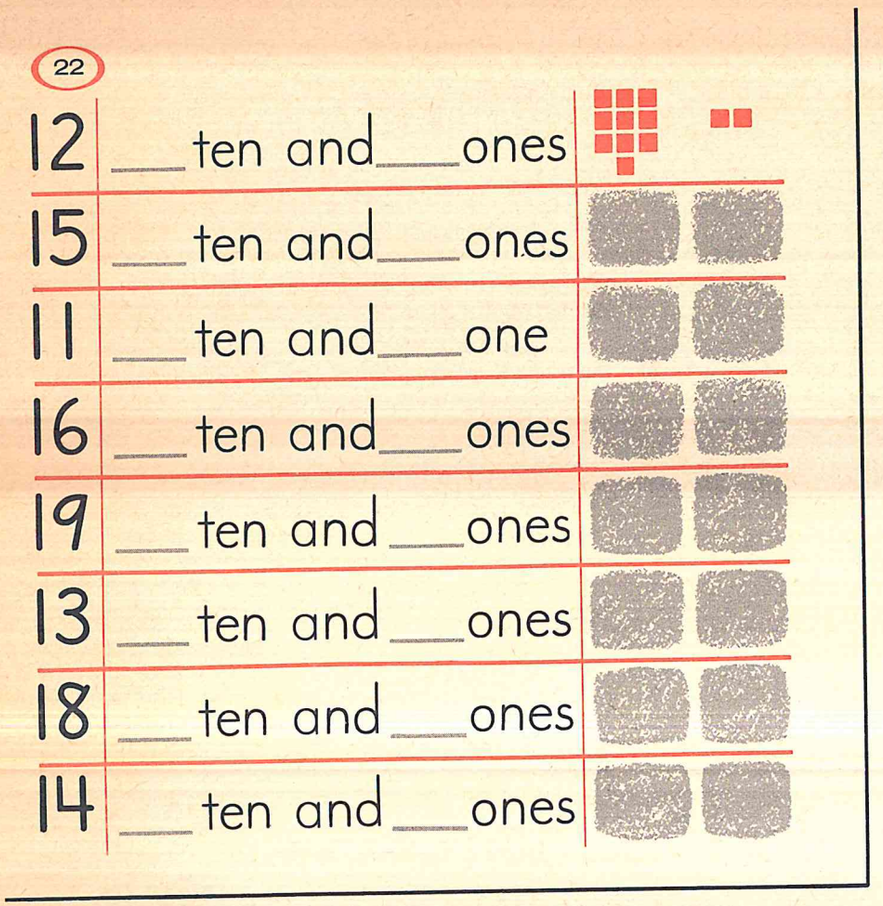
Variation may then be introduced by asking the children to read and locate the families. Help them discover that it doesn't matter whether one places the numerals vertically (down) or horizontally (across). The pattern of the numerals is the same.

Extended Activity

On 2″ square cards develop a set of numerals from 1 through 99. Make a chart with pockets. This may be made by stitching one-inch strips across the chart or by pasting or stapling pockets such as library pockets to the tagboard.

Place the numerals in scrambled position. Ask the children to rearrange them correctly in either horizontal or vertical sequence.

Several small editions of this chart might be made and placed on the arithmetic table so that children might work with them during free time.



22

Purpose

To develop awareness of place value. To analyze teen numerals as tens and ones.

Materials

A set of 20 counters for each pupil. A counting box. A counting box for each pupil.

A counting box may be made by drawing a line down the middle of a large piece of colored construction paper. Write "tens" to the left of the line and "ones" to the right. Place value may be shown by placing counters on the box.

TENS	ONES
● ●	● ● ● ● ● ●

The counting box here shows 26.

Have each child make a small individual counting box with colored paper.

> Historical Note: Counting boxes were widely used by merchants throughout Europe and the Near East for figuring place value. The term "counter" in the grocery store is derived from this.

Developmental Activity

Work with a small group seated around a table.

Write a numeral from 10 through 19 on the chalkboard or say it. Have a pupil show what the numeral means by placing counters on his counting box. Repeat for each numeral from 10 through 19.

Reverse the procedure. Put counters on the counting box. Have a pupil read the box and write the numeral it represents on the chalkboard. Emphasize reading the numerals as 1 ten and 3 ones or 1 ten and 5 ones. The focus here is on structure. Repeat for each numeral from 10 through 19.

Next have a pupil count a set of 14 counters into a pile. Write the numeral 14 on the chalkboard. Frame the 4. **Who can read this numeral?** [4] **Show how many it stands for with the counters. How many are left?** [10] Have a pupil count to show it is 10. **Which numeral in 14 stands for the 10? Frame it.** [1] **The numeral on the right tells how many ones; the numeral on the left tells how many groups of ten.**

Repeat for 12, 19, 17, 13, 18, and 15.

Procedure

Open your books to page 22.

Look at the first row. What is the numeral on the left? [12] **What numerals do we need to write on the lines to make another name for 12?** [1 for ten and 2 for ones]

What does the picture on the right in the first row show? Point to it. [a pattern for 12, 1 ten and 2 ones]

Orally work the next row. **What is the numeral on the left? What numerals go on the lines? Can you draw a dot picture to show 1 ten and 5 ones?**

Now work the rest of the page. Work neatly. Are we sitting tall?

Circulate and help as needed.

Extended Activity

Have members of small groups take turns showing each of the numbers from 10 through 19 on a spoolboard. Spoolboards may be obtained from most school supply houses.

23

Purpose

To extend the place-value idea to the twenties.

Materials

A large counting box. A set of 20 counters and a counting box for each pupil.

Developmental Activity

This is a small group activity.

Say or write a numeral from 20 to 29. Have a pupil show what the numeral means with counters on the counting box. Have each pupil show what it means with counters on his counting box. Do this for each numeral from 20 to 29.

Reverse the procedure. Put counters on the box. Have a pupil read them and write the numeral represented on the chalkboard. Emphasize reading numerals as 2 tens and 4 ones or 2 tens and 7 ones. The focus is on structure. Do this for each numeral from 20 through 29.

Procedure

Open your books to page 23.

Look at the first row. What is the numeral on the left? [23] **What numerals do we need to write on the lines to make another name for 23?** [2 for tens and 3 for ones]

What does the picture on the right in the first row show? Point to it. [a dot pattern for 23, 2 tens and 3 ones]

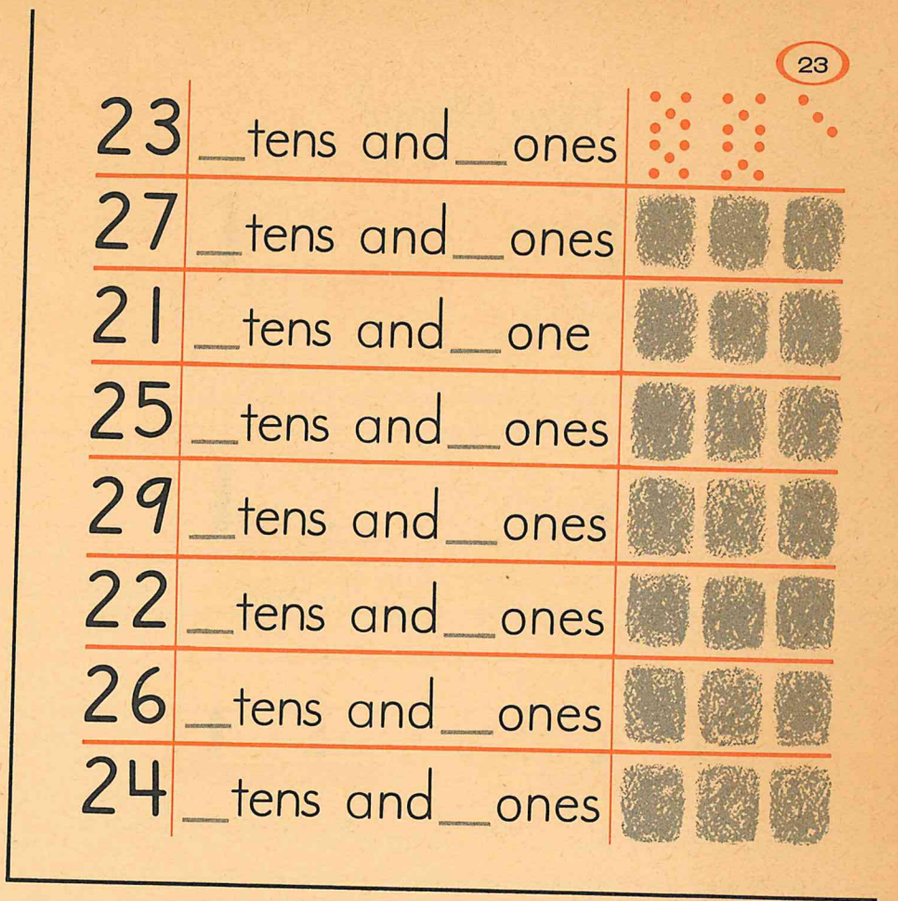
Orally work the next row. **What is the numeral on the left? What numerals go on the lines? Can you make a dot picture to show 2 tens and 7 ones?**

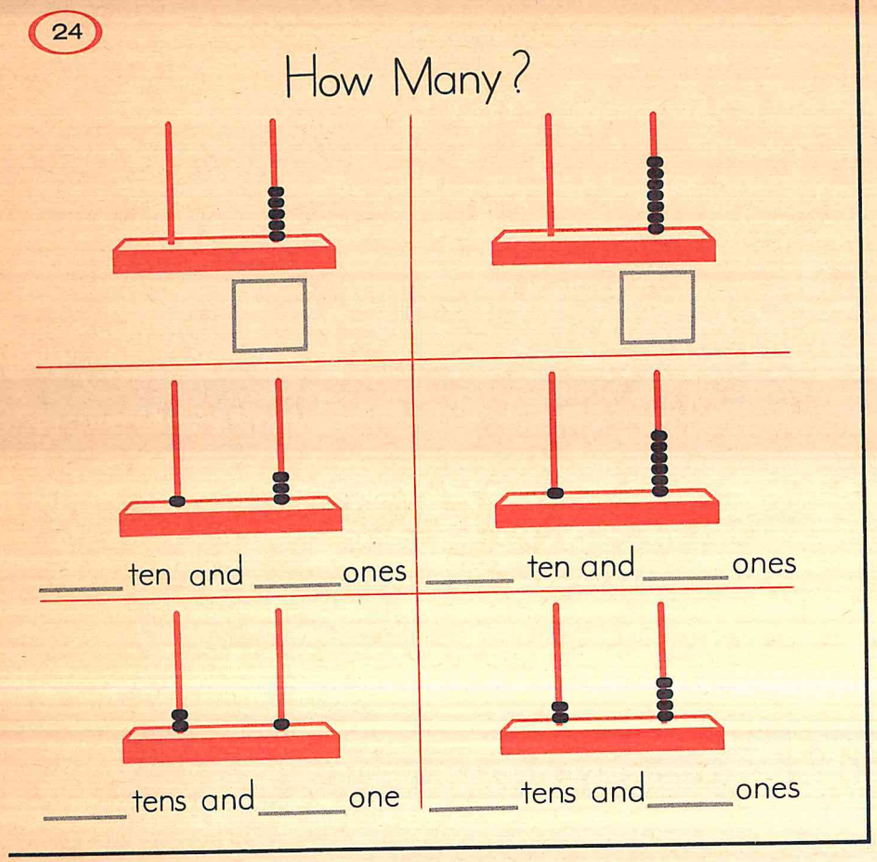
Now work the rest of the page. Work neatly.

Circulate and help as needed.

Extended Activity

Have members of small groups take turns showing each of the numerals from 20 to 29 on the spoolboard.





24

Purpose

To extend the understanding of place value through the use of a simple abacus.

Materials

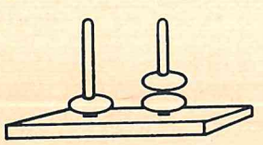
A simplified abacus.

Developmental Activity

Class, many people use a device something like this to help them do arithmetic. Show the simplified abacus or draw one on the chalkboard. **It is called an abacus. By studying the abacus we can understand numbers better.**

Let's all say abacus (AB uh kus) together. Ready, abacus; again, abacus.

Show 12 on the abacus or drawing.



On an abacus this column (point to the right-hand column) **stands for ones. How many ones are shown here?** [2]

This column (point to the left-hand column) **stands for tens. How many tens are shown here?** [1]

What is another name for 1 ten and 2 ones? [12] **Who can write the numeral 12?**

Show (or draw) a variety of values on the abacus: 14, 5, 16, 8, 18, 11, 3. As each number idea is presented, have the children describe it as 1 ten and 4 ones or 14. When the group appears to have a good understanding of how an abacus is read, have them work the page. If more practice is needed, make up additional examples.

Procedure

Open your books to page 24. This is a page about the abacus.

Look at the first picture. What does the abacus show? What numeral should we write in the frame? [5]

What should we write in the next frame? [7]

What does the first abacus in the second row show? [1 ten and 3 ones] **What is another way of saying 1 ten and 3 ones?** [13] **Who can explain how we will write this numeral under the abacus?**

Use a similar procedure for the rest of the page.

Now let's all write the answers in our best handwriting. Are we sitting up tall?

Circulate and help as necessary.

Extended Activity

Run off 8½″ x 11″ worksheets with pictures of nine simplified abaci (pronounced AB uh sigh). Have each pupil show a number on each abacus and write the numeral for it under the picture.

25

Purpose

To read numbers on the abacus.

Materials

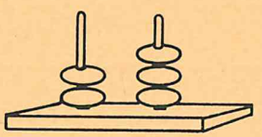
A simple abacus.

Developmental Activity

In our last lesson we learned how to read numbers on a kind of _____. [abacus] **Today we are going to learn to read harder ones. Using the abacus was fun, wasn't it?** Hold up the abacus or draw one on the chalkboard. **Who can show us the ones' column? Who can show us the tens' column?**

Here is an easy number. Show it on the abacus. **What is it?** [12]

Show this series on the abacus: 23, 26, 31, 38, 44, 47, 52, 59, 63, 65. Have each abacus setting read as tens and ones and also as a number.



The abacus shows how many tens? [2] **How many ones?** [3] **Another name for 2 tens and 3 ones is _____.** [23]

Have pupils take turns writing the answers on the chalkboard.

Procedure

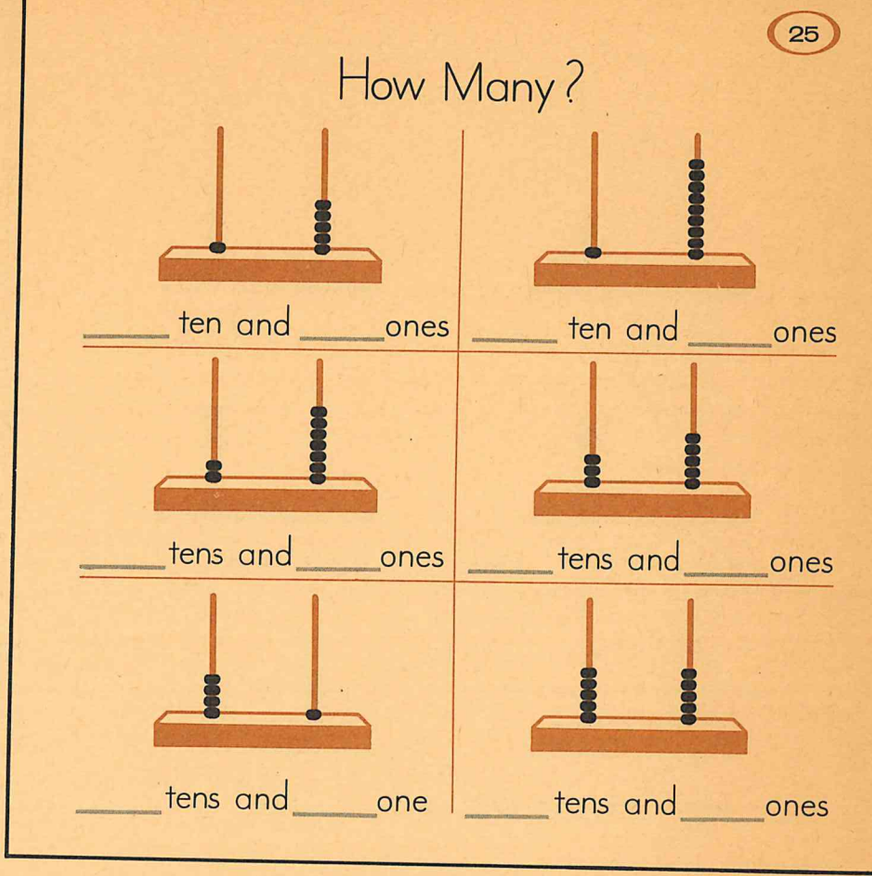
Open your books to page 25.

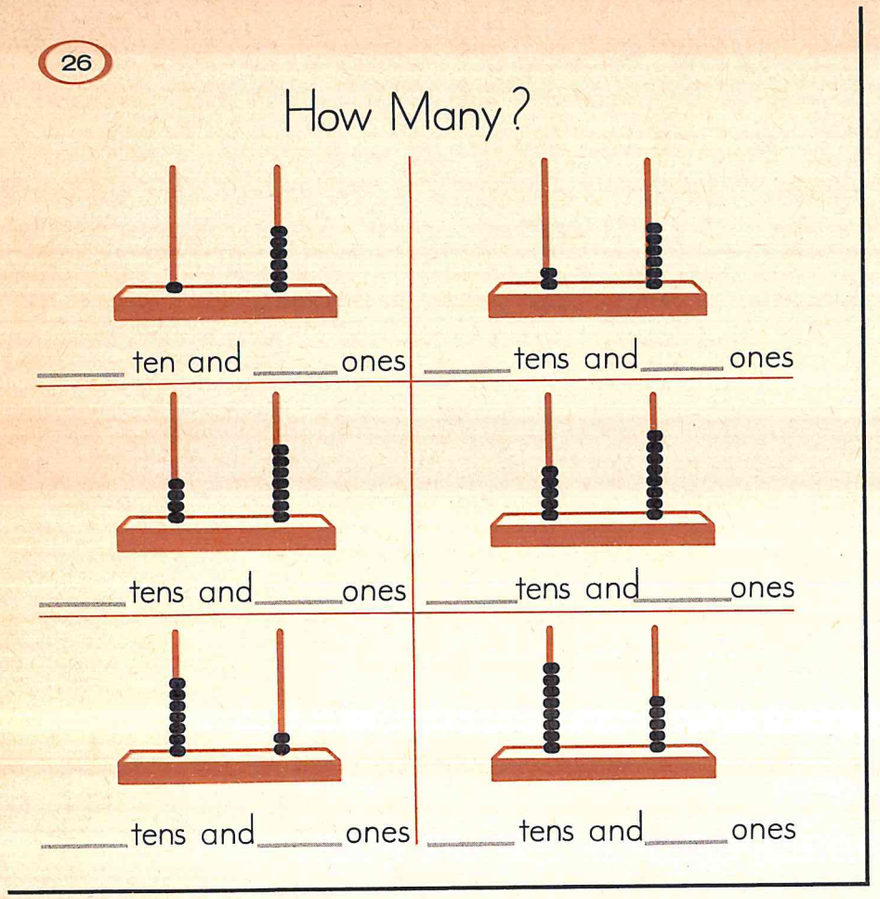
What do the pictures show? Discuss. **What number is shown on the first abacus?** [15] **the second?** [19] **Under each abacus write the numerals that tell how many tens and ones are shown.**

Write carefully. Circulate and help as needed.

Extended Activity

Pass out worksheets of 8½″ x 11″ paper with pictures of abaci. Have each pupil show a number on each abacus and write the numeral for it underneath. Have pupils work in pairs to check each other's work.





26

Purpose

To extend the reading of numbers on the abacus.

Material

A simple abacus.

Developmental Activity

Boys and girls, today we are going to read some larger numbers on the abacus. Are you ready? Hold up the abacus or draw a picture of an abacus on the chalkboard. Using the following set of examples: 41, 49, 53, 57, 66, 62, 78, 75, 84, 88, 92, and 96; have a pupil read each number first as tens and ones, then in the usual way (forty-one).

Procedure

Open your books to page 26.

What do the pictures show? What number is shown on the first abacus? [16] **the second?** [26] **Can we write the numeral under each abacus to tell how many tens and how many ones?**

Write carefully. Circulate and help as needed.

Extended Activity

Pass out $8\frac{1}{2}''$ x 11″ paper with 9 or more abaci. Have the children show a number on each abacus and write the numeral for it underneath. Have pupils, working in pairs, check each other's work.

27

Purpose

To extend the reading of numbers on the abacus.

Materials

A simple abacus.

Developmental Activity

Today we are going to see how well we know how to read the abacus. Are you ready? Hold up the abacus or draw a picture of the abacus on the chalkboard. Have pupils take turns responding to the following: 11, 22, 33, 44, 55, 73, 84, 92, 75, 86, 93. Discuss. Have each example read first as tens and ones and then in the usual way.

Procedure

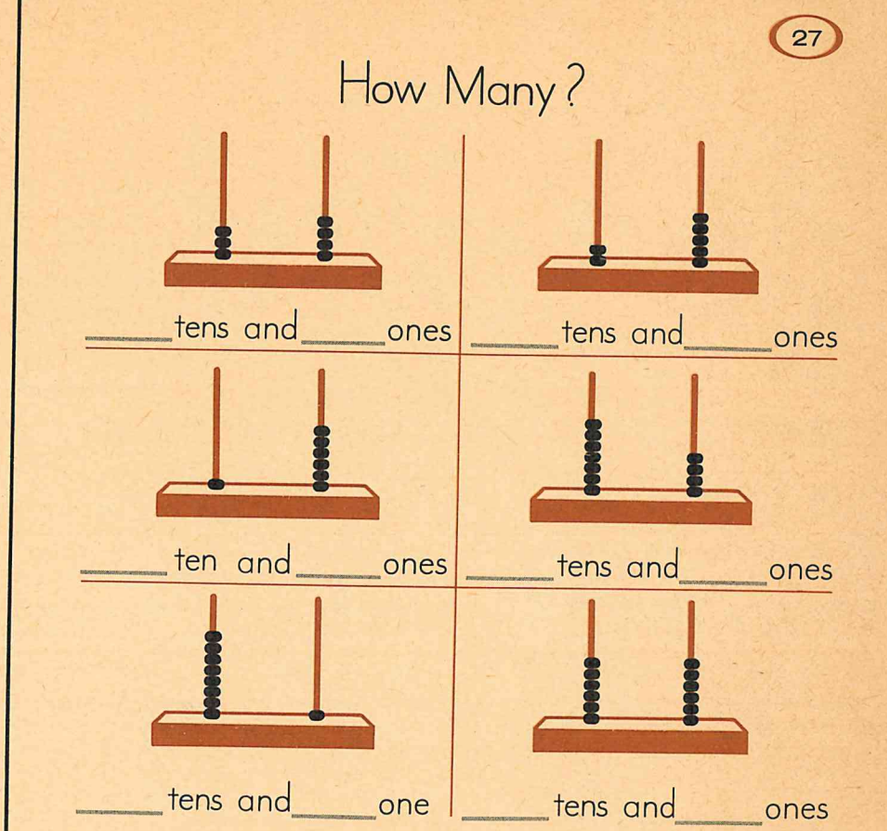
Open your books to page 27.

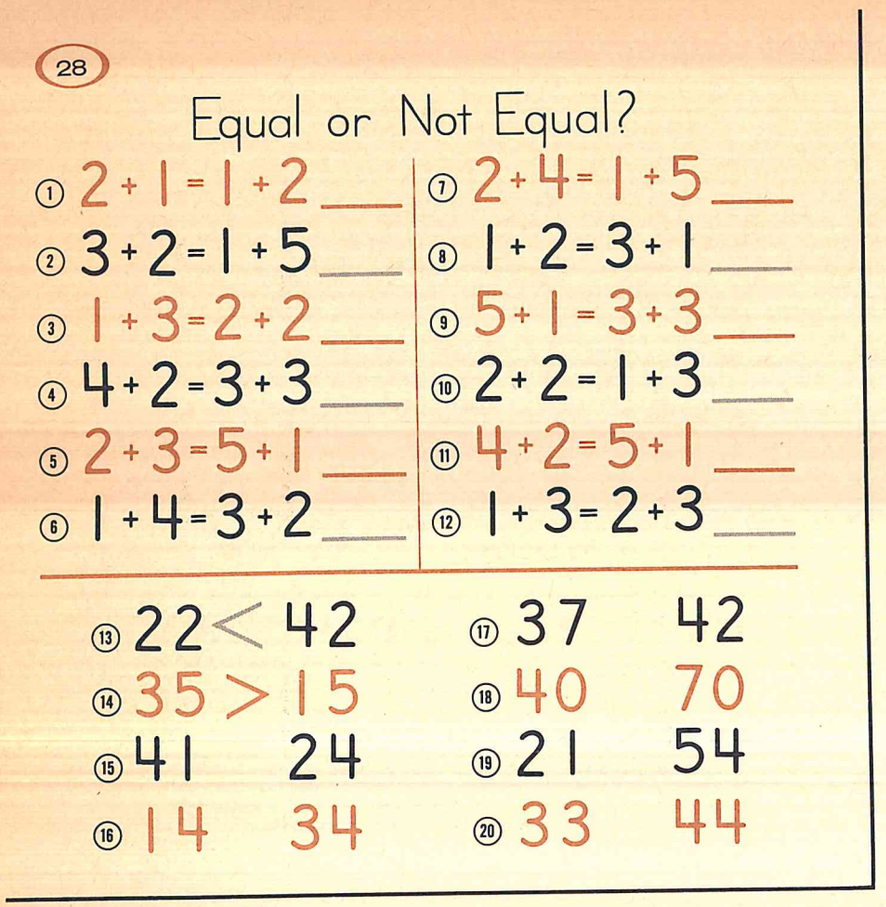
What do the pictures show? Discuss. **What number is shown on the first abacus?** [34] **the second?** [25] **These are easy! Under each abacus write the numeral that tells how many tens and how many ones.**

Circulate and help as needed.

Extended Activity

Pass out 8½″ x 11″ paper with abaci on it. Have each pupil show a number on each abacus and write the numeral for it underneath. Have pupils, working in pairs, check each other's work.





28

Purpose

To introduce the idea of equalities.

Vocabulary

Equal, statements.

Developmental Activity

Earlier we learned that a number can have many names. What are two other names for 4? Put the numeral 4 on the chalkboard or flannel board. [3 + 1, 2 + 2, 1 + 3, 5 − 1, etc.] **There are many other names for 4.**

Today we are going to learn a new game. Here is how it is played. Write on the chalkboard: 3 + 1 = 1 + 3. We read this: Three and 1 equals 1 and 3. Is this true? [yes] **Three and 1 and 1 and 3 are both names for 4.**

If the statements on each side of the equal sign are names for the same number, then the sentence is true. If the sentence is true, we can write "yes" after it. If the statements are not names for the same number, the sentence is not true. Then we write "no" after the sentence.

Let's try some examples. Write the following on the chalkboard, one at a time:

$4 + 1 = 3 + 2$ ___
$2 + 2 = 1 + 3$ ___
$5 + 1 = 1 + 1$ ___
$3 + 2 = 4 + 1$ ___
$3 + 3 = 2 + 2$ ___
$4 + 0 = 3 + 2$ ___
$2 + 4 = 1 + 5$ ___

The blanks after the sentences should be read as "Is this true?" Write "yes" or "no," as the case may be, on the line.

If the group understands the game, move on to the Procedure. Otherwise, make up some additional examples.

Procedure

Open your books to page 28.

What does it say at the top of the page? [Equal or Not Equal?]

Who can read the first number sentence? [2 and 1 equals 1 and 2.] **The sentence is true, isn't it?** [yes] **Another name for each part of the sentence is** ———. [3]

Who can read example number 2? [3 and 2 equals 1 and 5.] **Is this true?** [no] **Another name for the first part is** ———. [5] **Another name for the second part is** ———. [6] **Five and 6 are not names for the same number.**

Who can read example number 3 for us? [1 and 3 equals 2 and 2.] **Is this true?** [yes] **Why?** Discuss.

Use a similar procedure for each example in the first column. Then have the group work examples 1 through 12. Have them write "yes" or "no" on the lines.

Look at the bottom of the page. Who can read example number 13? [22 is less than 42.]

Who can read number 14? [35 is more than 15.] **How can we finish number 15?** Discuss. Have the group work examples 15 through 20.

Circulate and give help as necessary.

Extended Activity

Pass out 6″ x 9″ sheets of ruled newsprint. Have the group copy these sets of numerals from the chalkboard:

14	19	41	52
26	21	37	25
35	37	28	12
19	23	46	29

Have them put in the sign for more than (>) or less than (<).

29

Purpose

To extend the idea of equalities.

Developmental Activity

In our last lesson we used many addition names for numbers. Today we are going to use many subtraction names in the same game.

Write on the chalkboard: $3 - 1 = 4 - 2$. **We read this number sentence: Three take away 1 equals 4 take away 2. Is this true?** [yes] **Why?** [Because $3 - 1$ and $4 - 2$ are both names for 2.]

What should we do if the sentence is true? [Write "yes" after it.]

Write on the chalkboard: $4 - 3 = 5 - 2$. **We read this: Four take away 3 equals 5 take away 2. Is this true? What is another name for the first part?** Point to $4 - 3$. **What is another name for the second part?** [3] **Are 1 and 3 names for the same number?** [no] **Is this sentence true?** [no] **What should we write after it?** [no]

Write this set of examples on the chalkboard, one at a time:

$6 - 4 = 4 - 2$ ____	$4 - 1 = 5 - 2$ ____
$5 - 4 = 6 - 1$ ____	$3 - 2 = 4 - 3$ ____
$6 - 3 = 4 - 1$ ____	$4 - 3 = 5 - 2$ ____

Have the group work them. The blanks after each sentence should be read as, "Is this true?" Take time for a pupil to explain why each answer is a "yes" or a "no."

If the group clearly understands the game, move on to Procedure. If they do not, work additional examples with them.

Procedure

Open your books to page 29.

What does it say at the top of the page? [Equal or Not Equal?] **Who can read sentence number 1?** [3 take away 1 equals 4 take away 2.] **Is this true?** [yes] **Why?**

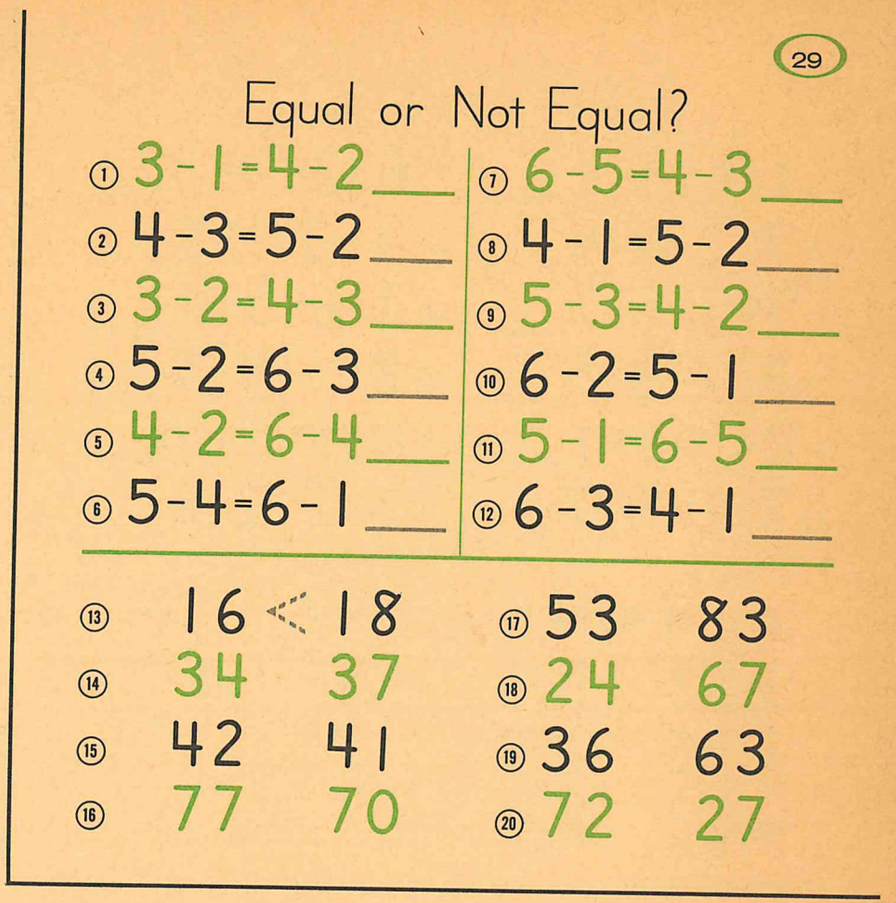
Use a similar procedure for sentence number 2.

Then have the group work with the rest of the set independently. Have children take turns explaining why their answer is correct.

Look at the bottom of the page. Who can work sentence number 13? [16 is less than 18.] **Work the others.**

Are you sitting up tall?

Circulate and help as needed.



Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the group copy this set of examples from the chalkboard and put in the signs for more than (>) and for less than (<):

11	16	55	84
36	39	26	69
45	42	35	53
78	73	74	47

30

Equal or Not Equal?

① 1 + 6 = 3 + 4 ___	⑦ 6 + 2 = 7 + 1 ___
② 7 + 2 = 4 + 4 ___	⑧ 4 + 3 = 1 + 8 ___
③ 5 + 3 = 1 + 7 ___	⑨ 3 + 6 = 5 + 4 ___
④ 2 + 7 = 3 + 5 ___	⑩ 8 + 1 = 4 + 5 ___
⑤ 2 + 5 = 6 + 1 ___	⑪ 0 + 8 = 8 + 0 ___
⑥ 7 + 0 = 0 + 7 ___	⑫ 5 + 2 = 2 + 6 ___

⑬ 14 < 41	⑰ 46 64
⑭ 33 44	⑱ 58 85
⑮ 75 25	⑲ 21 12
⑯ 62 81	⑳ 73 37

30

Purpose

To review the addition facts in the 7-, 8-, and 9-groups by using equality statements.

Developmental Activity

In our last two lessons we checked number sentences to see whether they were true or not true. Today we are going to do the same with some harder ones. First, let's review what we mean by a sentence which is true. Put this sentence on the chalkboard: My name is Miss (Mrs.) _____. **Is this true?** [yes] Now change the sentence to: My name is George Washington. **Is this true?** [no] **In each number sentence if the names on each side of the equal sign do not stand for the same number, is the sentence true?** [no]

Let's try some. Write the following set of examples, one at a time, on the chalkboard:

$0 + 7 = 7 + 0$ ___
$7 + 2 = 3 + 5$ ___
$1 + 6 = 2 + 5$ ___
$4 + 4 = 2 + 7$ ___
$8 + 0 = 0 + 8$ ___
$3 + 6 = 2 + 7$ ___
$4 + 3 = 1 + 8$ ___
$6 + 2 = 7 + 1$ ___

Have the pupils (1) read the number sentences (be sure they say, "Is this true?" after each); (2) answer the question "yes" or "no"; (3) explain why their answer is correct.

If the group understands this, move on to Procedure. If they do not, give them practice with some additional examples.

Procedure

Open your books to page 30.

What does it say at the top of the page? [Equal or not Equal?] **Let's all frame the words with our hands.**

Who can read the first number sentence? [1 and 6 equals 3 and 4.] **Is this true?** [yes] Why?

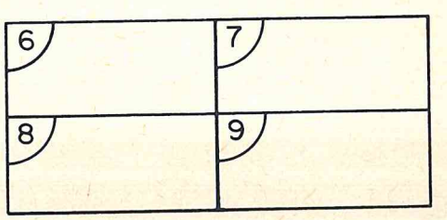
Who can read sentence number 2? Use a similar procedure for this. **Work examples 3 through 12. Write the answers neatly.**

Before we start, look at the bottom of the page. Do you remember how to work these? Go ahead and work this page.

Circulate and give help as needed.

Extended Activity

Pass out 8½" x 11" newsprint. Have the group label the page to match this model.



Write six other addition names for each number. Write more if you can.

31

Purpose

To review the subtraction facts in the 7-, 8-, and 9-groups by using equality statements.

Developmental Activity

In our last three lessons, we have worked with number sentences. We are going to work with some more. These are subtraction or take away sentences.

On the chalkboard write: $8 - 7 = 9 - 8$. **Let's read this. Eight take away seven equals nine take away eight. Is this true?** [yes] **Why?** [$8 - 7$ and $9 - 8$ are both names for 1.]

Let's work some together on the chalkboard:

$7 - 6 = 9 - 3$ ____
$9 - 8 = 8 - 7$ ____
$9 - 1 = 8 - 3$ ____
$7 - 4 = 9 - 6$ ____
$9 - 7 = 7 - 5$ ____
$9 - 2 = 8 - 1$ ____
$9 - 7 = 8 - 6$ ____
$7 - 3 = 8 - 5$ ____
$8 - 2 = 7 - 1$ ____
$7 - 2 = 9 - 4$ ____

Have individual pupils (1) read the number sentence (have them read the blank as "Is this true?"); (2) answer "yes" or "no"; (3) explain why they have answered this way.

If the group can work the set with understanding, move on to Procedure. If they need more practice, have them work additional examples.

Procedure

Open your books to page 31.

What does it say at the top of the page? [Equal or Not Equal?] **Let's frame the words. Read them together—Equal or Not Equal. Again—Equal or Not Equal.**

Who can read the first number sentence? [7 take away 5 equals 9 take away 7.] **Is this true?** [yes] **Why?**

Who can read sentence number 2? Use a similar procedure for this. **Work examples 1 through 12. Write the answers neatly.**

Before we start, look at the bottom of the page. Do you remember how to work these? Go ahead and work this page.

Circulate and help as needed.

31

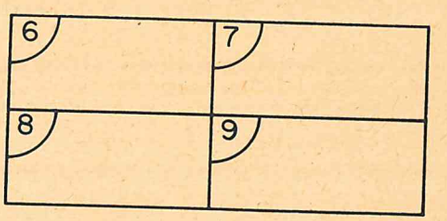
Equal or Not Equal?

① 7-5=9-7 ___	⑦ 8-3=6-2 ___
② 8-4=9-5 ___	⑧ 9-4=7-2 ___
③ 9-6=7-5 ___	⑨ 7-1=8-2 ___
④ 8-3=9-1 ___	⑩ 8-5=7-3 ___
⑤ 8-7=9-8 ___	⑪ 8-6=9-7 ___
⑥ 9-3=7-6 ___	⑫ 9-2=8-1 ___

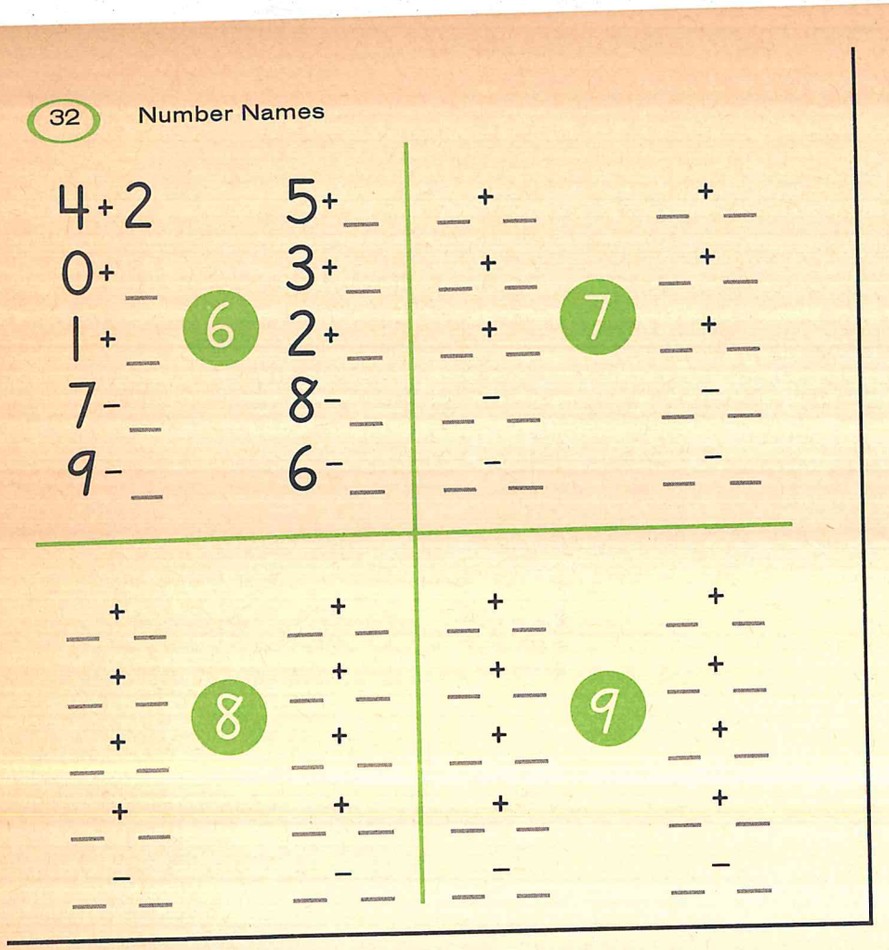
⑬ 65	45	⑰ 17	71
⑭ 87	27	⑱ 92	29
⑮ 42	92	⑲ 41	14
⑯ 76	56	⑳ 54	45

Extended Activity

Pass out $8\frac{1}{2}''$ x $11''$ newsprint. Have the group label the page to match this model.



Write six other subtraction names for each number. Write more names if you can!



32

Purpose

To have the pupils create a variety of number names for 6, 7, 8, and 9.

Developmental Activity

We have learned that there are many names for a number. Let's make a set of names for 4. Have pupils use addition and subtraction to give other names for 4. Some are $3 + 1$, $2 + 2$, $1 + 3$, $4 + 0$, $0 + 4$, $5 - 1$, $6 - 2$, $7 - 3$, $105 - 101$, etc. Have the child who suggests a name write it on the chalkboard. Let the children have fun with this.

The subtraction names may involve large numbers. Encourage a variety of names. Addition names having more than two numerals may be suggested: $2 + 1 + 1$, $1 + 1 + 2$, etc.

Use a similar procedure for 5.

Procedure

Open your books to page 32.

These examples are like the ones we have been working. Do you think you can do them?

Circulate and help as needed. Encourage the pupils to use counters to check their work.

Extended Activity

Pass out sheets of $8\frac{1}{2}''$ x 11″ newsprint. Have each pupil write a numeral 9 in the upper right corner. **Write as many other names for 9 as you can.** Take time to evaluate this lesson. Put many examples on the chalkboard during the evaluation.

33

Purpose

To evaluate mastery of the addition combinations in 7, 8, and 9.

Materials

10 counters for each pupil.

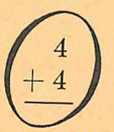
Developmental Activity

Pass out 4″ wide strips of ruled newsprint. Have the pupils number from 1 to 10 on the lines down the page. There are usually 11 lines on a page.

Use flash cards to show ten addition combinations from the 7-, 8-, and 9-families. Have the pupils write the answer as you show each flash card. Then have the group check the answers as you show each card again.

Procedure

Page 33 is a page of addition facts for 7, 8, and 9. Doing this page will show each of you how much you have learned. It will also tell me whether you need more help with these addition facts. As you work this page, will you do something for me? If you do not know the answer to an example, put a ring around the example. Demonstrate this on the chalkboard. **Also, put a ring around an example when you are not sure of its answer.**



When you have finished the page, check your answers with your counters. Write the answers in your best writing.

Make a scattergram like the sample to record the results of the test for each child.

NAME	7						8							9							
	6 +1	5 +2	4 +3	3 +4	2 +5	1 +6	7 +1	6 +2	5 +3	4 +4	3 +5	2 +6	1 +7	8 +1	7 +2	6 +3	5 +4	4 +5	3 +6	2 +7	1 +8

Each fact occurs in direct and reverse form. Pupils who miss a fact in both forms should be retaught before going further. One error is usually due to chance; two errors indicate a lack of understanding.

33

Add

6 +1 =	3 +5 =	7 +2 =	4 +4 =	8 +1 =	5 +2 =	3 +4 =
2 +5 =	6 +3 =	1 +7 =	2 +6 =	4 +3 =	2 +7 =	5 +3 =
1 +8 =	6 +2 =	4 +5 =	3 +6 =	7 +1 =	5 +4 =	1 +6 =

34

Subtract

8	7	9	7	8	9	8
-4	-5	-1	-2	-6	-5	-3
9	8	7	9	7	8	9
-8	-2	-3	-7	-1	-5	-4
7	9	8	7	9	8	9
-4	-3	-1	-6	-2	-7	-6

34

Purpose

To evaluate the children's mastery of the subtraction combinations in 7, 8, and 9.

Materials

10 counters for each pupil.

Developmental Activity

Pass out 4″ wide strips of ruled newsprint. Have the pupils number their papers from 1 to 10 down the page. (There are usually 11 lines on a page.)

Use flash cards to show ten subtraction combinations from the 7-, 8-, and 9-families. Have the pupils write the answer as you show each flash card. Then have the group check the answers as you show each card again.

Procedure

Today you are going to work page 34 to see how well you know the subtraction facts for 7, 8, and 9. This will let me know how to help you. Also, it will show each of you how much you have learned.

When you do not know the answer to an example, put a ring around the example. Demonstrate this on the chalkboard. **When you are not sure of the answer to an example, put a ring around it also.**

8 − 4

When you have finished your work, check your answers with counters. Write the answers in your best writing.

Record the results of this test on a scattergram like that shown.

NAME	7						8							9							
	7-6	7-5	7-4	7-3	7-2	7-1	8-7	8-6	8-5	8-4	8-3	8-2	8-1	9-8	9-7	9-6	9-5	9-4	9-3	9-2	9-1

Each of the subtraction facts occurs in direct and reverse form. Children who miss both examples should be retaught before proceeding further. One error is usually the result of carelessness; two errors usually indicate a lack of understanding.

35

The ruler on this page may be cut out and used for measuring. If this is to be done, page 36 should be taught before page 35.

Purpose

To extend the use of the ruler; to recognize its markings; to develop awareness of the yardstick as a measuring device; to show the relationship of the ruler to the yardstick.

Vocabulary

Foot, ruler, half as long as, about as long as, exactly the same as, one-half, yard, yardstick, equal to, three times as long as, one-third as long as, one-half as long as.

Materials

$\frac{1}{4}$″ dowel rod, broom handles with ends removed, foot ruler marked in inches, yardstick marked in inches, lightweight tagboard for pin wheel cut into 4″ squares, 12″ saw, small nails.

(Continued on next page.)

(Continued from page 34.)

Developmental Activity

Review the children's knowledge of the foot ruler.

Working in small groups under your guidance, have the children make pin wheels following the directions on page 35 in their books.

If desired, some of the children may make their pin wheels into wind vanes as follows: Make marks every 12 inches along the lengths of $\frac{1}{4}$" dowel rod. Cut the rod at each mark.

Have each child find the middle of the short lengths of dowel by measuring 6 inches from either end and making a pencil mark at that point. Push a nail through the rod at the mark.

Next measure one yard or 36 inches on the broomsticks. Cut them into 36" lengths. Take the 6" length of dowel rod with the nail through it and push the nail into the round end of the broomstick. Now fasten the pin wheel to the dowel by pushing the nail into the round end of the dowel rod.

Procedure

Look at page 35 in your books. Let us see how many things we can find in the picture that we used in making wind vanes.

Draw a ring around the broom handles in the picture. Is our box full or empty now?

Draw a line under the yardstick in the picture. Someone, bring me the yardstick in the room. Continue in this manner until everything has been located and named.

Now point to the right side of the page. **What is this? That's right. It is a little ruler. How long is it?** [6 inches] **How can you tell? What do the long marks on the ruler show?** [inches] **How many inches long is the ruler?**

What do you think the short lines show on the ruler? If children do not know, tell them they show how long one-half inch is.

Cut this ruler from your book. Use it to measure something which is about the same length as 6 inches. Now use it to measure something exactly the same length as the ruler. Can we use the ruler to measure something longer than six inches? How can we do this?

Someone, find the longer ruler in our room. How long is it? How can you tell? We say that it is a 12-inch ruler or a foot ruler. Is it longer than your foot? Measure to see. Do you think it is longer than Daddy's foot?

Would someone like to show how long 12 inches is on the chalkboard? (Approximate it.) **How can you be sure you are correct?** [Measure the line with a ruler.] **Mark off one foot. When we made our wind vane, what did we cut the same length as the foot ruler?** [dowel rod]

What other kind of measuring tool did we use? [yardstick]

To Make A Pin Wheel
Cut the dotted lines to the circle.
Mark every other corner.
Bring those corners to the center.
Push a little nail through them.
It will look like this.

Who can find one in the room? This is called a yardstick because it is a yard long. Have the children measure with foot rulers to see how long the yardstick is. After several have done this, ask what they found out. They should discover that three rulers are as long as one yardstick, or that a yard is three feet long.

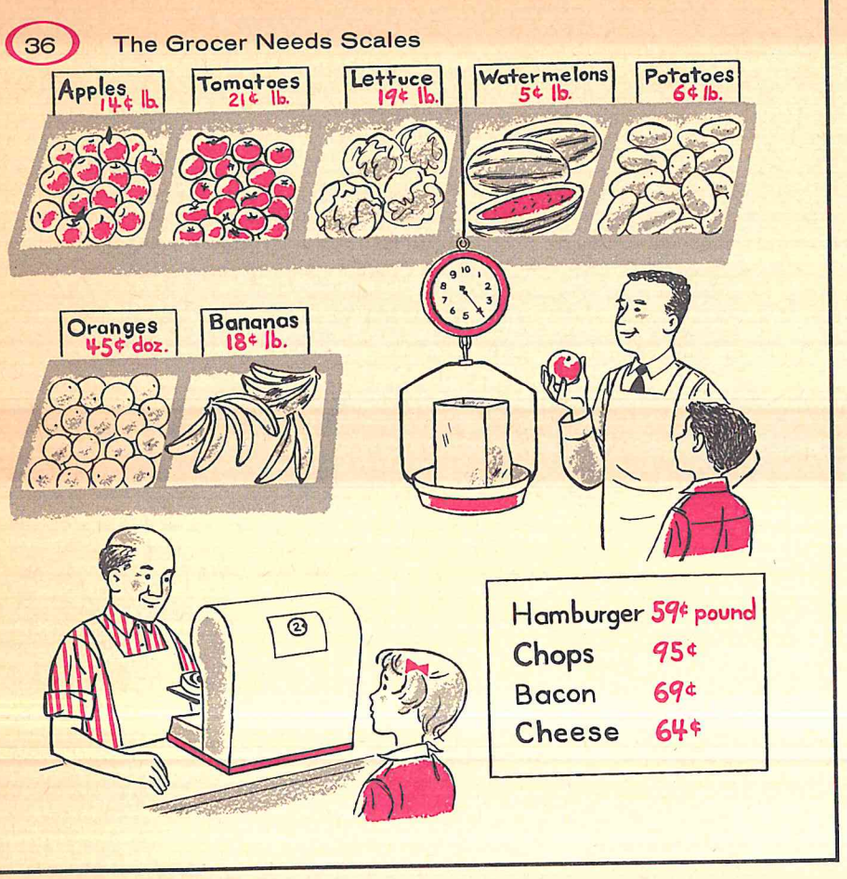
A folding yardstick may be made by taping three cardboard foot rulers together.

Extended Activity

Other construction experiences that involve the use of linear measurement may be small group projects such as making a birdhouse or a tray for feeding baby chickens.

In many schools, children are measured twice a year by the nurse. Without undue emphasis on the idea of who is tallest or who is shortest, you can use the data on the children's heights to demonstrate many ways of telling how tall the children are. For example, a child might be 4 foot rulers tall, or 1 yardstick and 1 foot ruler tall, or 48 inches tall.

Encourage the children to develop their own ways of expressing how tall they are.



36

Purpose

To develop the relationship between ounces and pounds; to discover that 16 ounces equal 1 pound; to become sensitive to the vocabulary of weight; to develop awareness of the need for weighing objects.

Vocabulary

Ounce, scales, lighter, pound, equals, lightest, heavy, heavier, heaviest, weight, weigh, almost, light, buying, selling, more than, less than.

Materials

Scales: household, kitchen, bath. Pound coffee can, shortening can, butter carton, candy kisses (one pound).

Developmental Activity

Make a study trip with the class to a local supermarket or grocery store. Arrange to have a store employee show the different kinds of scales used in the store and explain what each is used for.

Procedure

The information gained from the study trip should be utilized in discussing page 36 in the book.

Open your books to page 36. Call attention to the different scales shown on the page. **Did we see scales like these at the store? What were they used for?**

Who can read the signs that tell the prices? Call attention to the cent symbol and to the abbreviation of "pound." Have the class suggest reasons for using symbols and abbreviations. [save time, take less room]

Put a kitchen scales and the candy kisses on a convenient desk or table. Begin by putting some candy kisses on the scales. Ask the children to tell what is happening. [As candy is put on the scales, the pointer moves.] At this stage encourage the children to tell how much they think the kisses weigh. Accept any response given. Weigh all the kisses and see how the children's guesses compare with the actual weight.

Take some kisses off the scales, until the pointer shows eight ounces or half a pound. Ask the children how many kisses are on the scales; then ask how many are not on the scales. Count each group of kisses to discover that half the candy is on the scales and half is not. Have the children read the scales (one-half pound or eight ounces) and develop the idea that half a pound is another name for eight ounces.

Put a drawing of the scales on the chalkboard, clearly showing the ounce and pound markings. Explain how ounces and pounds are read. Count the markings between the numerals.

Extended Activity

Since the children have been made aware of a grocery store or supermarket situation, they would enjoy writing about it. This activity could be used as an introduction to written story problems. Also, writing the abbreviations would reinforce them.

Have the children write a story or stories about this page. Before they begin have an oral example given such as:

I went to the store for my mother. She asked me to buy some fruit. I bought a pound of bananas for 18¢. I also bought a dozen oranges for 45¢.

When they have finished, discuss the stories with the group and make them into problem-solving situations such as: How much money did (child's name) spend at the store?

Children should be encouraged to observe and report the need for measuring weight in as many different situations as possible. Encourage the children to make up further problems.

37 38

Purpose

To review reading time on the hour and half hour. To extend the writing of time as 9:00 a.m. or 8:30 a.m.

An experience with time that relates to total living may be developed in connection with good health practices. The number of hours necessary for adequate sleep, the number of hours which should be spent in fresh air, and the use of leisure time are all very important health learnings.

Vocabulary

Hour, half hour, thirty, half past, minute hand, hour hand, long, short, o'clock.

Materials

A demonstration clock, butcher paper, paper plates, dowel rods for making a movie roll.

Developmental Activity

Review telling time on the hour and the half hour.

Refer to the daily program chart developed in lesson 16 for review of the relationship between time and various activities.

You will find the kit "Learning to Tell Time" useful in lessons on the clock. It is available from The Watchmakers of Switzerland Information Center; 730 Fifth Avenue; New York 19, N. Y.

Procedure

Open your books to page 37.

Let's do this page to find out how Ann spends her time.

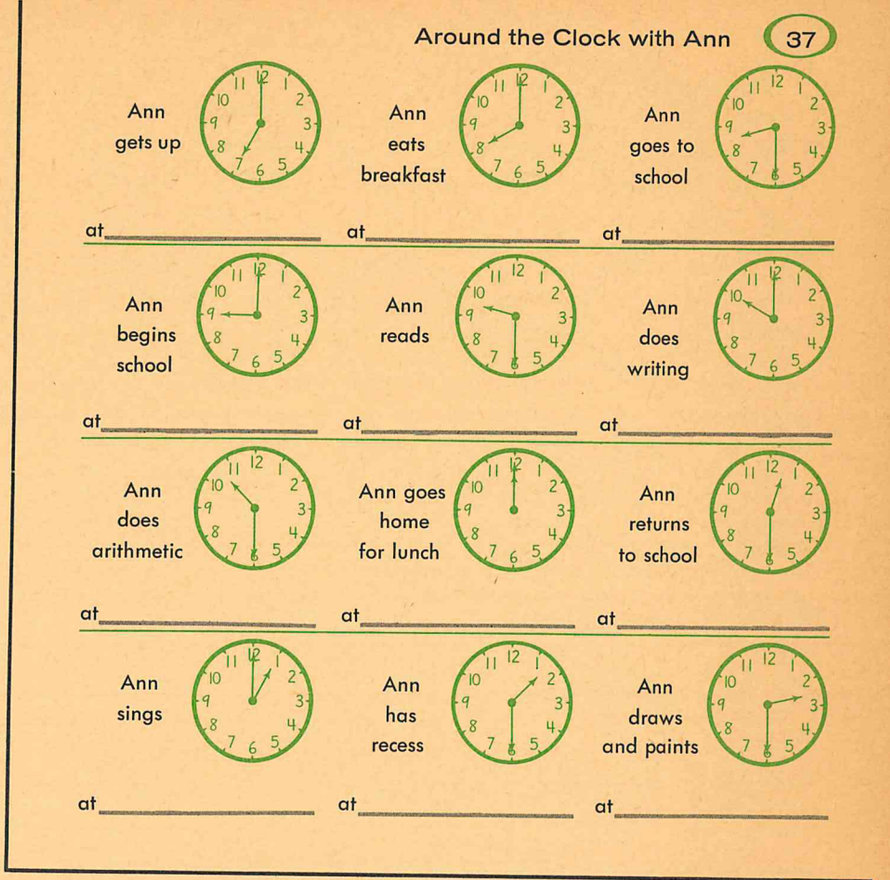
Point to the first clock. What time does it show? [7 o'clock] **Who can read to find out what Ann does at 7 o'clock? We may write 7 o'clock like this:** (write 7:00 a.m. on the chalkboard). **What does "a.m." tell you?** [It is morning.]

What letters would we use to show afternoon or evening? [p.m.] Have the children read the clocks to find where "p.m." should be first written.

Write 7:00 a.m. under the first clock.

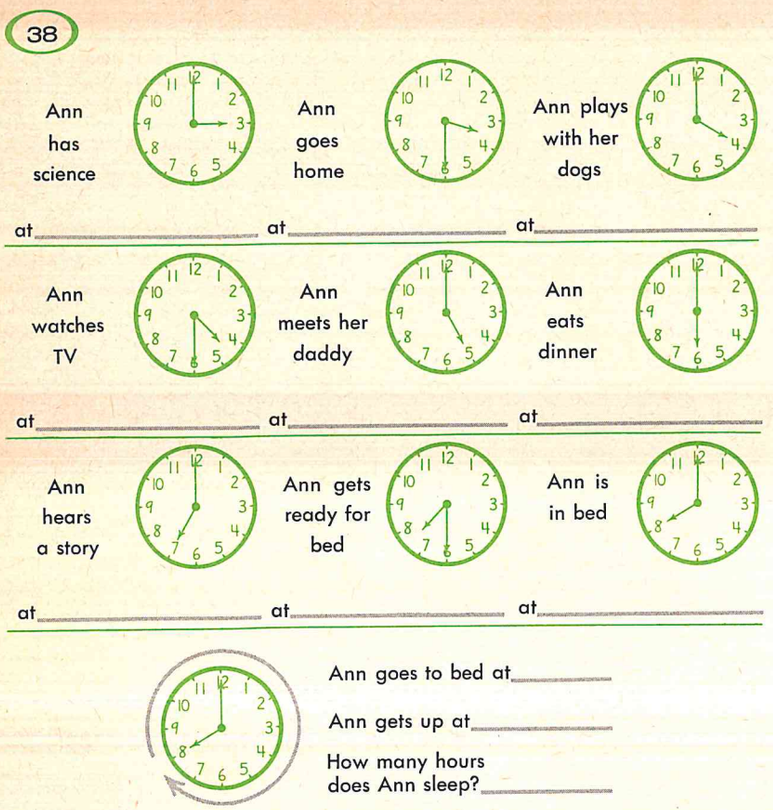
What time does the next clock show? What does Ann do at 8 o'clock? How should we write 8 o'clock? [8:00 a.m.]

What is different about the next clock? [Long hand points to 6; short hand is between 8 and 9.] **Can anyone tell what this clock says?** Show the time on the half hour several times on a demonstration clock. Have the class read the various times shown.

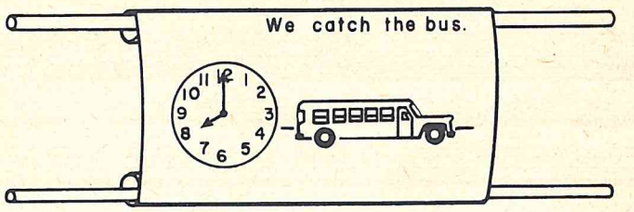


Then have the children continue page 37. Work with those who need help; permit those who can work independently to do so.

(Continued on next page.)



Pictures on the roll could be variations of the one shown here.



Small clocks, such as those available from The Watchmakers of Switzerland, may be used on the roll.

The illustrations may be freehand cutouts made by individual children. The sentences may be dictated by the children, and written by you, or they may be included in a writing lesson for the children.

Discuss situations in which knowing an exact time schedule is important, such as catching a train, airplane, or bus, or tuning in a TV or radio program.

Encourage children to make original rhymes about clocks and time.

Begin a chart "Our Time Words." Also, begin individual number word boxes with the same words.

If pages 37 and 38 are done on different days, refer the children back to the first clock on page 37 for the time Ann gets up. If the children cannot answer how many hours Ann sleeps, have them count around the clock.

Extended Activity

Each child could make a booklet "Around the Clock with (child's name)." The children might draw clocks with various times and then write a sentence telling what they do at that time. Those who are not very proficient at writing could draw pictures showing what they do at various times.

A rubber stamp of a clockface without hands would be very helpful to the children for this activity.

The children might participate in a group project by making contributions for a movie roll under your guidance.

39

Purpose

To count and write by 5's from 5 to 100.

Vocabulary

The counting words of five, ten, fifteen, twenty, twenty-five, thirty, thirty-five, forty, forty-five, fifty, fifty-five, sixty, sixty-five, seventy, seventy-five, eighty, eighty-five, ninety, ninety-five, one hundred.

Materials

Counters, blocks, counting beads, squared newsprint, chairs, chalk, books, nickels, pennies, thermometer.

Developmental Activity

Many second grade children are already able to count by 5's. However, in order to make sure all your pupils can do it, you should present a variety of counting experiences. One such experience is to use a counting frame. Counting nickels is another. Counting objects within the room, such as chalk, books, and chairs is still another.

The markings 5, 10, 15, 20, etc., on the thermometer may also be referred to. Reference may be made to the hundred chart. Ask the children to read only those numerals you point to, such as 5, 10, 15 to 100. Change the procedure by asking children to point to the numerals and read them by 5's to 100.

Procedure

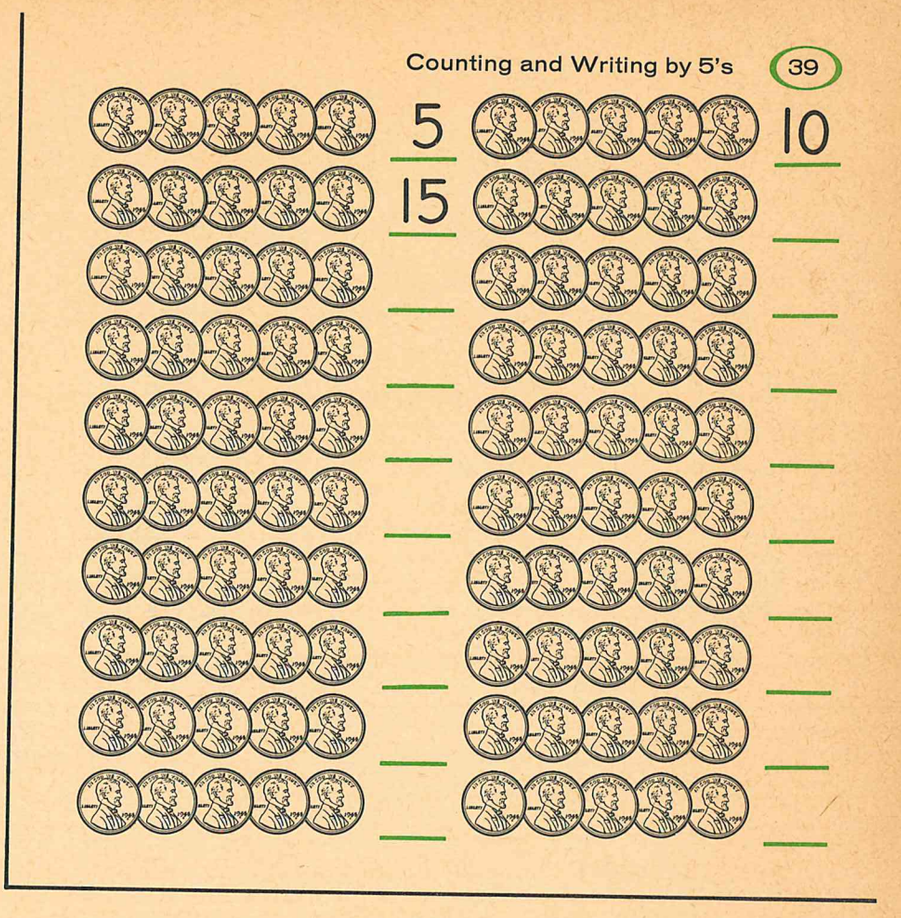
Now open your books to page 39.

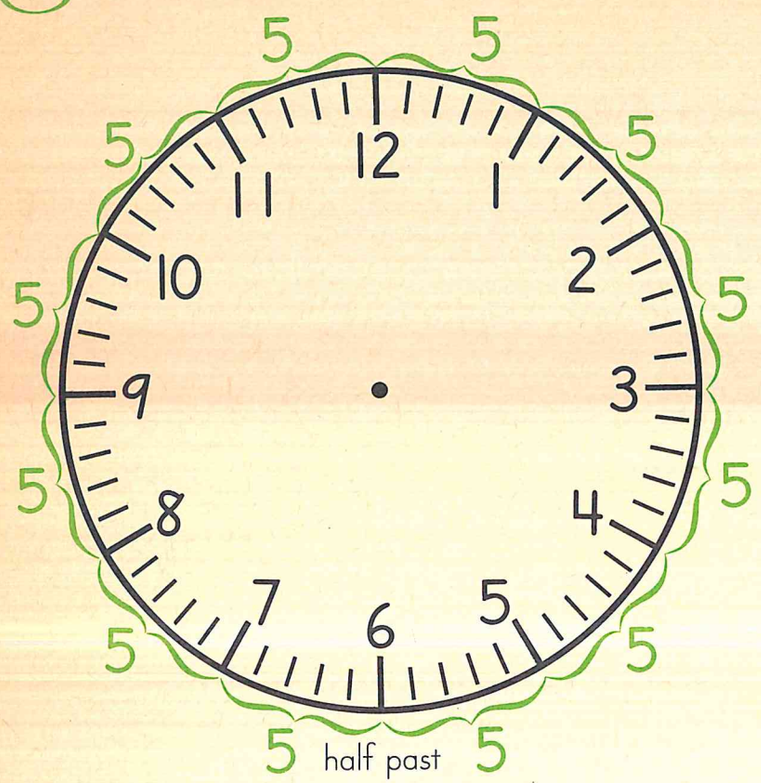
Show the children the pattern set up on the page. Have them count the pennies by 5's a few times. Then explain that they are to make the numerals to show that 5 more pennies are added at the end of each group of pennies. Work with small groups so that you may supervise the children's writing of the numerals.

Extended Activity

Give the children 100 discs. Ask them to arrange the discs in sets of 5 on their desk. Check this later for accuracy.

Give out squared newsprint and ask the children to write from 5 to 100 by 5's. Check the papers for accuracy and encourage the children to take these home.





40

Purpose

To develop the meanings of the markings on a clockface; to discover that there are 60 minutes in 1 hour.

Vocabulary

Minutes (sixty), minute hand, until, after, before, half past.

Materials

A large clockface with minute markings and movable hands. Toothpicks, or sticks, or strips of paper for clock hands.

Lesson 40 can be presented on several successive days.

Developmental Activity

Work with a small group. Show how the clock hands move.

Relate to children's experiences the concept that time may be measured in minutes. **How long were we out for recess?**

Draw a number line from zero to five on the chalkboard. Have the children count from zero to five as you point to each mark. Tell them that we count the minutes on the clock the way we count the marks on the number line. Twelve on the clock is like zero on the number line. Point to the 1 minute marking and say "One," etc. Have them count by minutes.

Ask a child to count the minutes from the numeral 12 to the numeral 1. **How many minutes are there?** [5] Have another child count from 1 to 2. Have him begin counting at the mark after 1. **How many minutes are there? When the long hand on the clock moves from the numeral 3 to the numeral 4, how many minutes will have passed?** Demonstrate on the clock. Do this several times until the children understand it.

We can count the minutes on the clock by 1's. How else can we count them? Let's try counting by 5's. Count to the half hour. **How many minutes are there in a half hour? When the minute hand points to 6, it is half past the hour.**

Can we count to find out how many minutes there are in an hour? Continue counting from half past. Then write on the chalkboard: 60 minutes = 1 hour. Move the clock hands.

Set the hour hand at 3 to give practice in reading the time 5, 10, 15, etc., minutes after the hour. Have the children count by 5's. Have them verify some of the times by counting by 1's.

As a challenge, point the long hand to 18 after the hour.

Permit children to move the hands and tell the time.

Teach a new kind of countdown, pointing to 25, 20, 15, 10, 5 on the hundred chart. **After the minute hand passes the half hour mark, we count minutes to (until) the next hour. We count backwards as in our countdown.** Move the minute hand so the clock reads 25 to 4. Ask if anyone knows what time it is now. Repeat for 20 of, 15 to, etc.

Procedure

Use page 40 as a fun experience.

Give each child paste sticks. Make one a little shorter than the other. Show various times on the demonstration clock. Have the children "set" their clocks at various times and read the time.

Extended Activity

Encourage children to tell time with a toy clock during free periods. The more able children may help those who need practice.

Prepare worksheets with clockfaces. Have the time written under each clock. The children will draw in the clock hands.

Let parents know what the children have learned about telling time. Encourage them to give additional practice.

Continue adding new time words to the word box.

41

Purpose

To extend the understanding of the numeral 10 and the number word ten. To explore the ideas these symbols represent.

Materials

A set of 10 counters for each pupil.

Developmental Activity

Write the numeral 10 on the chalkboard. **Who can read this numeral? Today we are going to study the idea of ten. First, put your counters on your desk in front of you. Make a 10-group.**

> Pupils will organize their 10-groups in various ways. Some will watch their neighbors and appear concerned if their patterns are not the same. This lesson should help children realize that the 10-group can be structured in many ways or that there are many possible groupings or patterns.

We can arrange our counters in many interesting ways. Take time for various pupils to show and tell how they placed their counters. Many will have different patterns. **Which way of placing your counters is correct?** [all] **Are there other ways we could put them?** Explore this. **If we want to see how many, easily and quickly, are some patterns better than others?** Explore this.

Do these patterns suggest some other names for 10? Explore, having pupils show the various combinations with their counters. **Can we write number sentences for each of these other names?** Have pupils put the number sentences on the chalkboard:

$9+1=10$ $8+2=10$ $7+3=10$ $6+4=10$ $5+5=10$
$1+9=10$ $2+8=10$ $3+7=10$ $4+6=10$

Do this until all the addition pairs have been written.

Are there other names for 10 we can write, using addition? Some are:

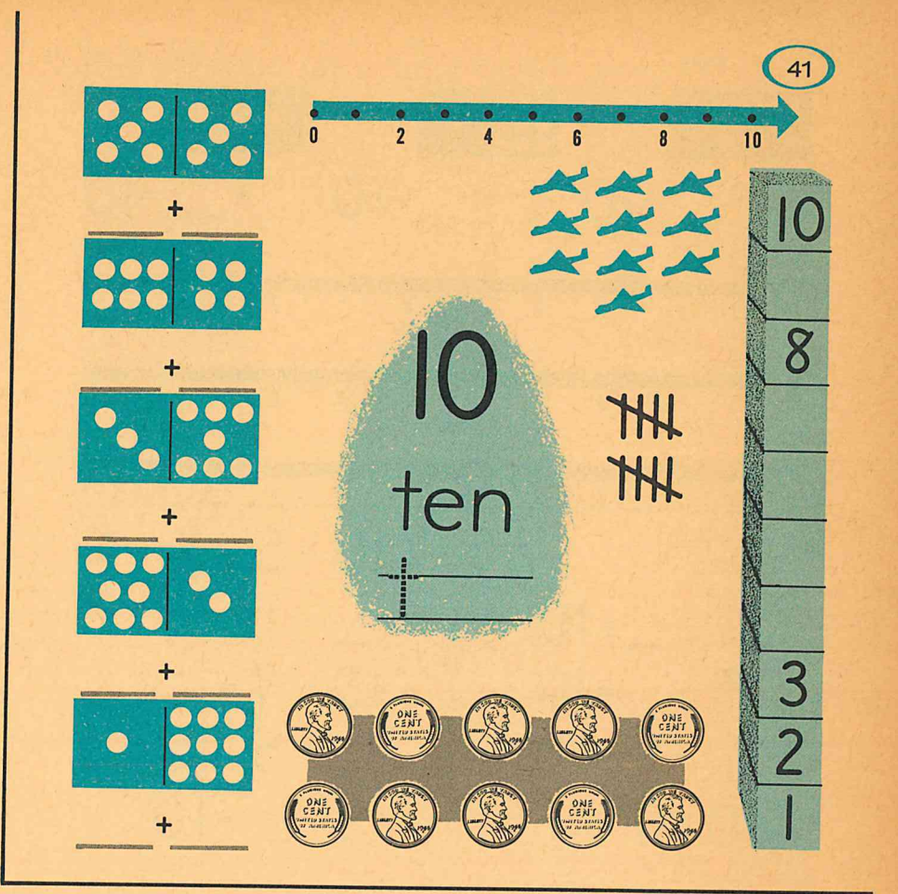
$3+3+2+2=10$; $3+3+3+1=10$; $5+2+3=10$.

There are many more possible names than time will permit exploring. Stop when the group has a good grasp of the idea.

Procedure

Open your books to page 41.

Draw a ring around the word "ten" in the middle of the page. Now write the word "ten" on the line.



Find the column of dominoes. What number name for 10 is suggested by the first domino? Write it on the lines. Five and 5 is another name for what? [10] **What number name is suggested by the second domino? Write it in. Six and 4 is another name for _____.** [10] Use a similar procedure for each domino.

Find the airplanes. What number sentence does this picture suggest? Explore this with the group orally.

Find the tally marks. How many are there? Discuss.

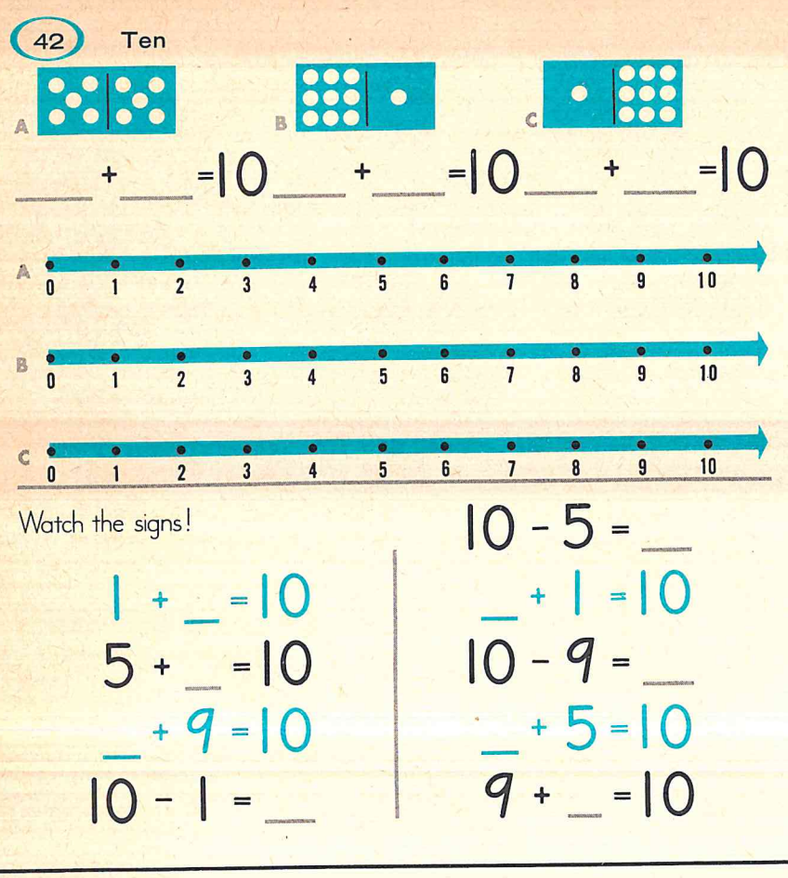
Find the pennies. How many pennies are there? What is another name for 10 pennies? [10 cents] **What one coin has the same value as 10 pennies?** [1 dime]

Find the tower of blocks. How many are there? [10] **Write in the numerals that are missing. Write carefully.**

Find the number line. What numerals are missing? [1, 3, 5, 7, and 9] **Write in the missing numerals. Are they odd or even?**

Extended Activity

Take out a set of counters. How many pairs of addition facts for 10 can you show with them? Write all the pairs in a column. If you write them all, there will be 9 pairs.



42

Purpose

To develop an understanding of the addition and subtraction relationships in 1, 9, and 10 and 5, 5, and 10.

Materials

A set of 10 counters for each pupil. A chalkboard number line.

Developmental Activity

Take out 10 counters and place them in a row on your desk. How many other names for 10 can we make with two groups of counters? Let's write the number sentence for each name on the chalkboard as we show it with our counters.

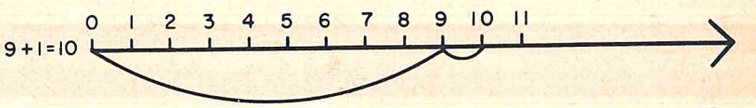
$9+1=10$	$6+4=10$	$3+7=10$
$8+2=10$	$5+5=10$	$2+8=10$
$7+3=10$	$4+6=10$	$1+9=10$

Encourage discussions about number relationships. For example, if the first number in the pair is made one larger, the second number becomes one smaller, etc.

Next have the children use counters to develop the subtraction facts in the 10-group ($10-1=9$, etc.). There are 9 facts.

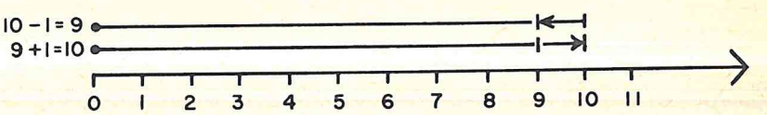
As each subtraction fact is developed, ask whether the children can make an addition number name for 10 with those numbers. A number line could be used to show the relationship.

Draw a number line from zero to 11 on the chalkboard. In the first grade a number line like this was used:



Who remembers what we call this? Each point on the number line has a number name. Read each number name as I point.

This year the number line will look like this, with the numerals below the line. You can show your work in the space above the line.



(Note: Arrowheads are used on line segments to show direction of operation.)

Straight line segments should be drawn above the number line to show the number relationships. Rulers may be used to draw the straight line segments.

Have various pupils use the number line to show the number pair relationships developed above.

From this discussion the idea that subtraction undoes addition may emerge. No formal attempt should be made at this level to develop the idea that subtraction is the inverse of addition.

Procedure

What is the number word at the top of page 42? [ten]

Find the first domino on the left side of the page. What letter is written beside it? [A] **We may call this domino A. We may call the others, domino B and domino C. Now look at domino A. How should we write the number sentence under it so that it tells the domino story?** [5 + 5 = 10] **Can you write the other two number sentences?** [9 + 1 = 10 and 1 + 9 = 10]

Now can you show each of these sentences on the number lines? Show the sentence for domino A on number line A.

(Continued on next page.)

(Continued from page 42.)

Look at the bottom part of the page. What should we do here?

Read the words at the top of the first column. What do they say? [Watch the signs!] What does that mean?

You may use counters to help finish the number sentences.

Extended Activity

Have each pupil make a set of 3″ x 5″ flash cards for each of the addition and subtraction facts in 10.

Encourage pupils to practice with a neighbor or alone.

43

Purpose

To extend understanding of the addition and subtraction relationships in 2, 8, and 10.

> Lessons of this type are excellent illustrations of the Commutative Law. Children will become aware that changing the order of the addends does not change the sum. They should be able to state this in their own words.

Materials

10 counters for each pupil, a chalkboard number line.

Developmental Activity

Take 10 counters and place them in a row. Separate them into a group of 2 and a group of 8. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$2+8=\_\_$	$10-2=\_\_$	$2+\_\_=10$	$\_\_+2=10$
$8+2=\_\_$	$10-8=\_\_$	$8+\_\_=10$	$\_\_+8=10$

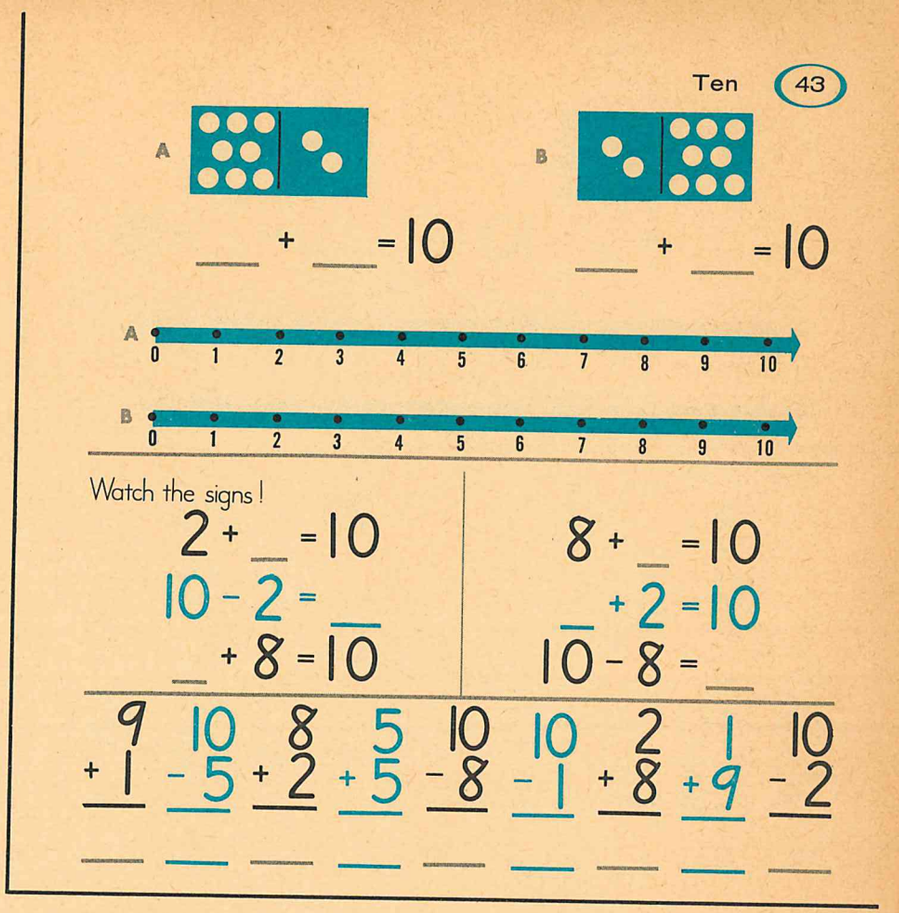
Have the pupils show or visualize each of these ideas on the number line at the chalkboard.

Procedure

Open your books to page 43.

What is the number word at the top of the page? [ten]

Find domino A. What is the dot pattern for domino A? [8 and 2] **Finish the number sentence under each domino. Then show it on the number line. On which number line should the sentence for domino A be shown?**



Finish each statement on the bottom part of the page. Then work the examples in the last row.

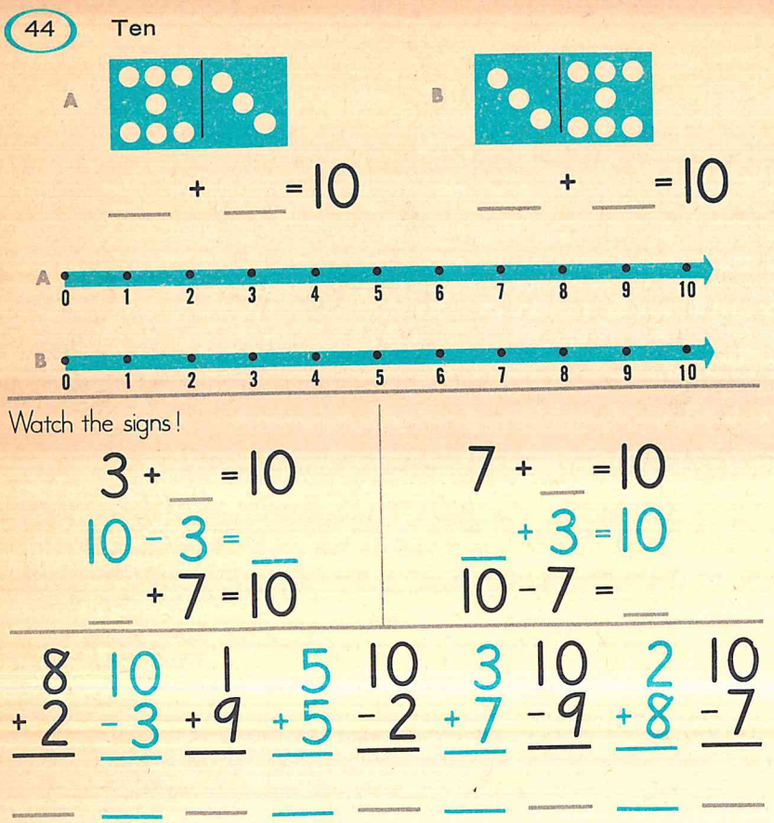
Extended Activity

Put the number pairs 1, 9 and 2, 8 on the chalkboard Have the pupils make up as many number sentences for them as they can. Sentences can be written on 6″ x 9″ ruled newsprint.

1, 9		2, 8	
$1+9=\_\_$	$1+\_\_=10$	$2+8=\_\_$	$2+\_\_=10$
$9+1=\_\_$	$9+\_\_=10$	$8+2=\_\_$	$8+\_\_=10$
$\_\_+1=10$	$10-9=\_\_$	$\_\_+8=10$	$10-8=\_\_$
$\_\_+9=10$	$10-1=\_\_$	$\_\_+2=10$	$10-2=\_\_$

> Number sentences like those above are called open sentences.

Have pupils write the open sentence with pencil and put the solution in with colored crayon. Take time to evaluate this work with the group.



44

Purpose

To extend understanding of the addition and subtraction relationships in 3, 7, and 10.

Materials

A set of 10 counters for each pupil, a chalkboard number line.

Developmental Activity

Take out 10 counters and place them in a row. Separate them into a group of 3 and a group of 7. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$3 + 7 = \_\_$ $\quad 10 - 3 = \_\_$ $\quad 3 + \_\_ = 10$ $\quad \_\_ + 3 = 10$
$7 + 3 = \_\_$ $\quad 10 - 7 = \_\_$ $\quad 7 + \_\_ = 10$ $\quad \_\_ + 7 = 10$

As this kind of analysis and synthesis continues, pupils will become more intrigued with relationships, as well as more proficient in the art of analysis.

Next have the group members take turns showing each of the statements on the number line at the chalkboard.

Procedure

Open your books to page 44.

What is the number word at the top of the page? [ten]

What letter is next to the first domino? [A] **What is the dot pattern for domino A?** [7 and 3] **Finish the number sentence under each domino. Then show it on the number line. Remember to show the sentence for domino A on number line A.**

Finish each statement or sentence on the bottom part of the page. Do the examples in the bottom row. Write carefully. Use counters if you want to.

Circulate and help as needed.

Extended Activity

Put the number pairs 5, 5 and 3, 7 on the chalkboard. Have the pupils make up as many number sentences as they can for them. The sentences may be written on 6″ x 9″ ruled newsprint.

5, 5		3, 7
$5 + 5 = \_\_$	$3 + 7 = \_\_$	$7 + \_\_ = 10$
$5 + \_\_ = 10$	$7 + 3 = \_\_$	$3 + \_\_ = 10$
$\_\_ + 5 = 10$	$\_\_ + 7 = 10$	$10 - 7 = \_\_$
	$\_\_ + 3 = 10$	$10 - 3 = \_\_$

Have pupils write each open sentence with pencil, putting the solution in with colored crayon. Using this method should help the children understand the special relationships in 5, 5, and 10 and 3, 7, and 10. It is important to take time to evaluate this work with the group.

45

Purpose

To extend understanding of the addition and subtraction relationships in 4, 6, and 10.

Materials

A set of 10 counters for each pupil, a chalkboard number line.

Developmental Activity

Take 10 counters and place them in a row. Separate them into a group of 4 and a group of 6. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$4+6=\_$	$10-4=\_$	$4+\_=10$	$\_+4=10$
$6+4=\_$	$10-6=\_$	$6+\_=10$	$\_+6=10$

Have the group members take turns showing each of the statements on the number line at the chalkboard.

Procedure

Open your books to page 45.

What is the number word at the top of the page? [ten]

What is the dot pattern for domino A? [6 and 4] **Finish the number sentence under each domino. Then show the number sentences on the number lines.**

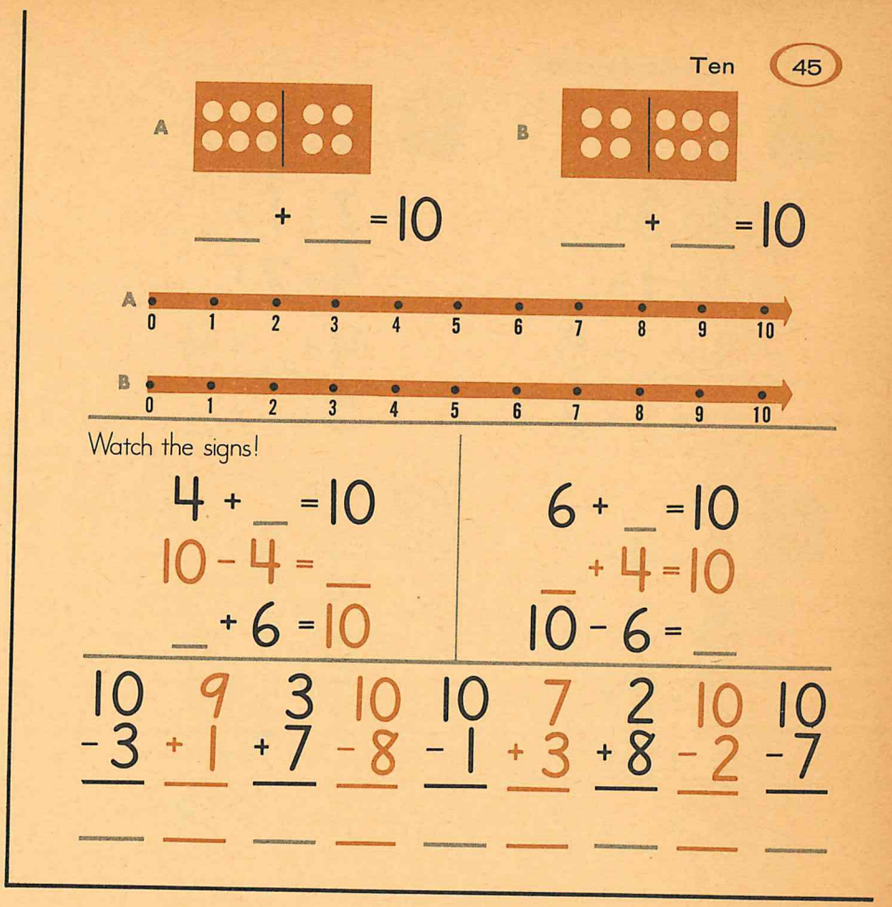
Finish each statement or sentence on the bottom part of the page—the bottom row, also. Write carefully. Use counters if you wish.

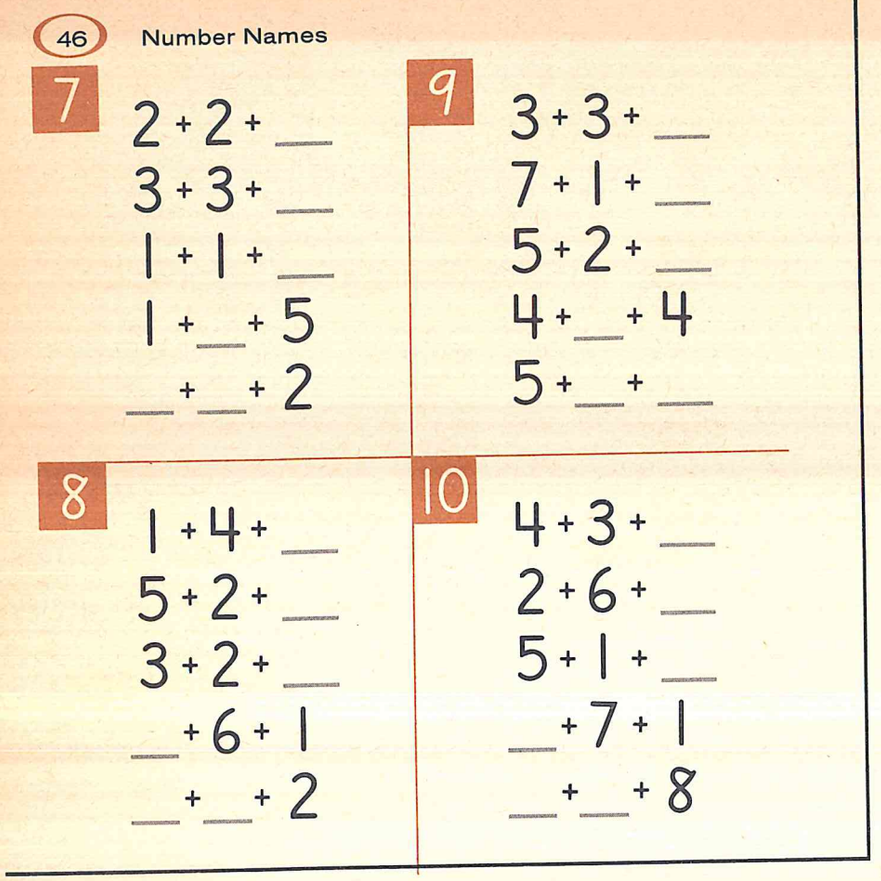
Extended Activity

Write the number pairs 1, 9 and 4, 6 on the chalkboard. Have the pupils make up as many number sentences as they can for them. Sentences may be written on 6″ x 9″ ruled newsprint.

1, 9		4, 6	
$1+9=\_$	$\_+1=10$	$4+6=\_$	$\_+4=10$
$9+1=\_$	$\_+9=10$	$6+4=\_$	$\_+6=10$
$1+\_=10$	$10-9=\_$	$4+\_=10$	$10-6=\_$
$9+\_=10$	$10-1=\_$	$6+\_=10$	$10-4=\_$

Have pupils write the open sentences with pencil, putting the solutions in with colored crayon. Doing this should help the children understand the special relationships in 1, 9, and 10 and 4, 6, and 10. It is important to take time to evaluate this work with the group.





46

Purpose

To give practice in finding the missing addend in number names for 7, 8, 9, and 10.

Materials

A set of 10 counters for each pupil.

Developmental Activity

Take out a set of 10 counters. Today let's try this game. Let's see how many different number names we can make for 7. We will use three numbers added together. We have learned many names for 7, using a pair of numbers. What is a name for 7, using three numbers?

As number names are suggested, do two things. First, have each pupil structure the idea with his counters. For example, have each child take 7 counters and arrange them to show a 2–3–2 pattern. Second, have a pupil write the appropriate number sentence on the chalkboard: $2 + 3 + 2 = 7$.

The set of possible solutions will include the following:

$1+1+5$	$2+1+4$	$3+1+3$	$4+1+2$	$5+1+1$
$1+2+4$	$2+2+3$	$3+2+2$	$4+2+1$	
$1+3+3$	$2+3+2$	$3+3+1$		
$1+4+2$	$2+4+1$			
$1+5+1$				

If zero is used as an addend, many additional possibilities will occur, but they cannot be shown with counters.

The Associative Property with respect to the addition of whole numbers is well illustrated in this lesson. Addends may be grouped in any order. This idea should be generalized in the pupils' own language.

A child demonstrates understanding by showing in how many different ways a set of three addends can be ordered to name 7.

Procedure

Open your books to page 46.

There is a number in the corner of each box on this page. Can you complete each example in the box so that it is another name for this number? How can we finish the first one? [by writing 3] **Is 2 + 2 + 3 another name for 7? Do the page. Work carefully. Write neatly.**

Circulate and give help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **Write the numeral 9 at the top of the paper. Write as many other addition names for 9 as you can. Use either two or three numerals.**

47

Purpose

To extend mastery of other names for 10, using addition.

Materials

A set of 10 counters for each pupil.

Developmental Activity

Take out a set of 10 counters.

How many number names for 10 can we make by using three numerals and addition? As number names are suggested, do two things. First, have each pupil use his counters to show the structure or grouping—for example, 0 0 0 0 0 0 0 0 0 0.

Second, have a pupil write the number sentence on the chalkboard: $3 + 3 + 4 = 10$. Have the group develop as many number names or solutions as they can. They may wish to use zero in chalkboard solutions. Such solutions cannot be shown with counters. If the children are interested in using zero, let them do so at the chalkboard.

Procedure

Open your books to page 47.

In the first column draw a line under each statement that is another name for 10.

Then find the answers to the six examples in the center of the page. Let's do the first one together. Four and 3 are ___. [7] Write the 7 as shown below. **Seven and 3 are ___.** [10]

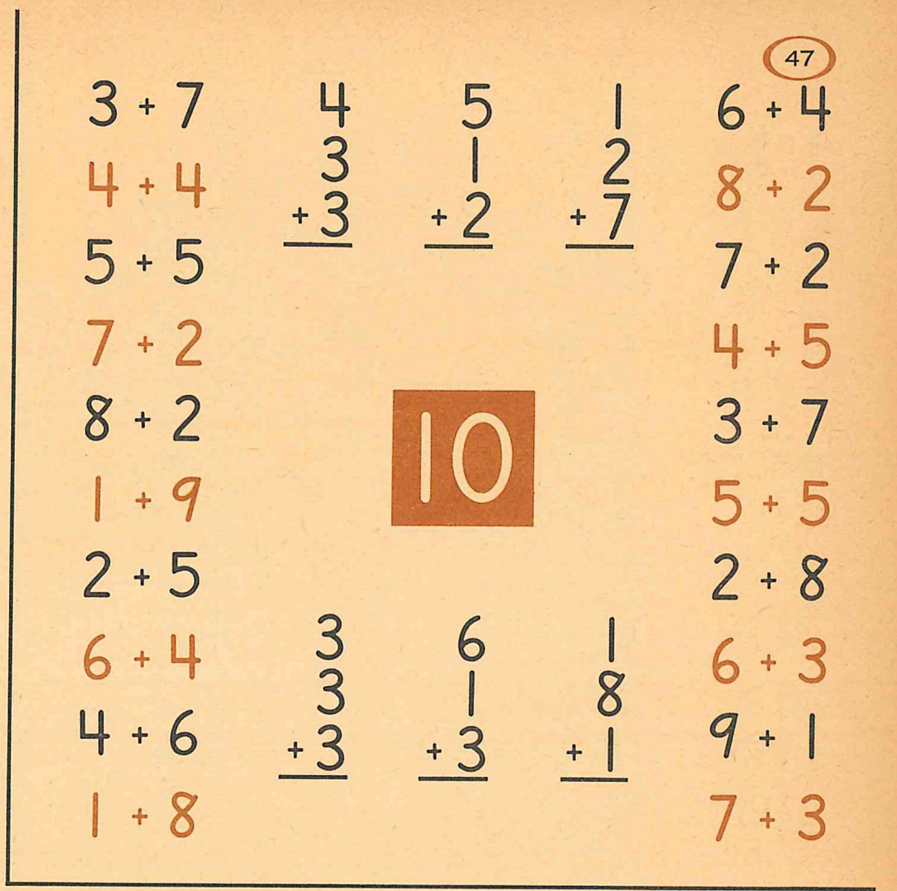
$$\begin{array}{r} 4 \\ 3 \\ +\,3 \\ \hline 10 \end{array} \quad \begin{array}{l} \\ \\ \\ \\ \end{array} \begin{array}{l} \\ \\ \\ \\ 7 \end{array}$$

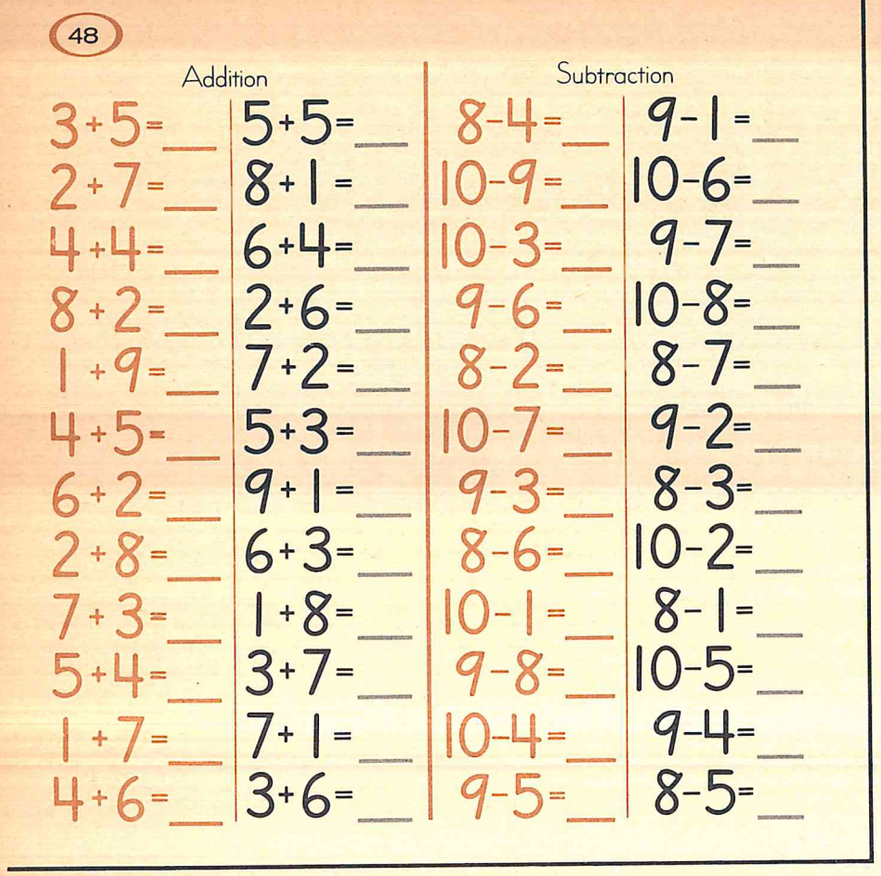
In the last column what should we do? [Draw a line under each statement that is another name for 10.]

Circulate and help as needed. Encourage pupils to use counters to check their work.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **Write the numeral 10 at the top of the page. Write as many other names for 10 as you can. Use either two or three numerals and addition.**





Purpose

To check mastery of the addition and subtraction facts in 8, 9, and 10.

Materials

A set of 10 counters for each pupil.

Procedure

Open your books to page 48.

Write the answer to each example on the line. The first half of the page is _____. [addition] Point to the word "addition."

The second half of the page is _____. [subtraction] Point to the word "subtraction."

Does anyone have a question? Work carefully. Write neatly.

Circulate and give help as needed.

Extended Activity

Have the pupils do two things:

(1) Take each addition number pair on the page and change one of the numerals to make a new number name using three numerals. For example, 3 + 5 may be changed to

3 + 3 + 2

3 + 1 + 4, etc.

(2) 8 − 4 is another name for 4. Write another subtraction number pair that names 4—for example, 9 − 5, 10 − 6, etc.

Take time for group evaluation of this work.

49

Purpose

To review odd and even numbers. To extend counting by 2's.

Vocabulary

Odd, even.

Materials

Make a 4″ x 6″ tag for each pupil. Attach a string so that the tag may be worn around the neck. Number the tags consecutively from 1 to — (class enrollment).

Developmental Activity

Keep the tags in numerical order. Give one to each child. **—— (child's name) has 1, which is an odd number; the next person has an even number, 2. What does the next person have?** [3] **Is this odd or even?** [odd] **What is the next number?** [4] **Is this odd or even? What number comes next?** [5] **Is this odd or even?**

Will the children with 1, 3, and 5 please stand. Are these odd or even numbers? [odd] **One child is standing, the next child is sitting, the next is standing. Let's have all the others with odd numbers stand. Every other child is standing. Read the numbers of the children who are standing.** Check to be certain they are odd numbers. List the odd numbers on the chalkboard.

What kind of numbers do the children who are still sitting have? [even] Have these children stand and read off their numbers in order. List them on the board. **Everybody, sit down.** Have the class read the lists on the board. **Reading either list of numbers is counting by 2's.**

I will call out a number. If the number is even, everyone having an even number, stand. If it is odd, all those having odd numbers, stand.

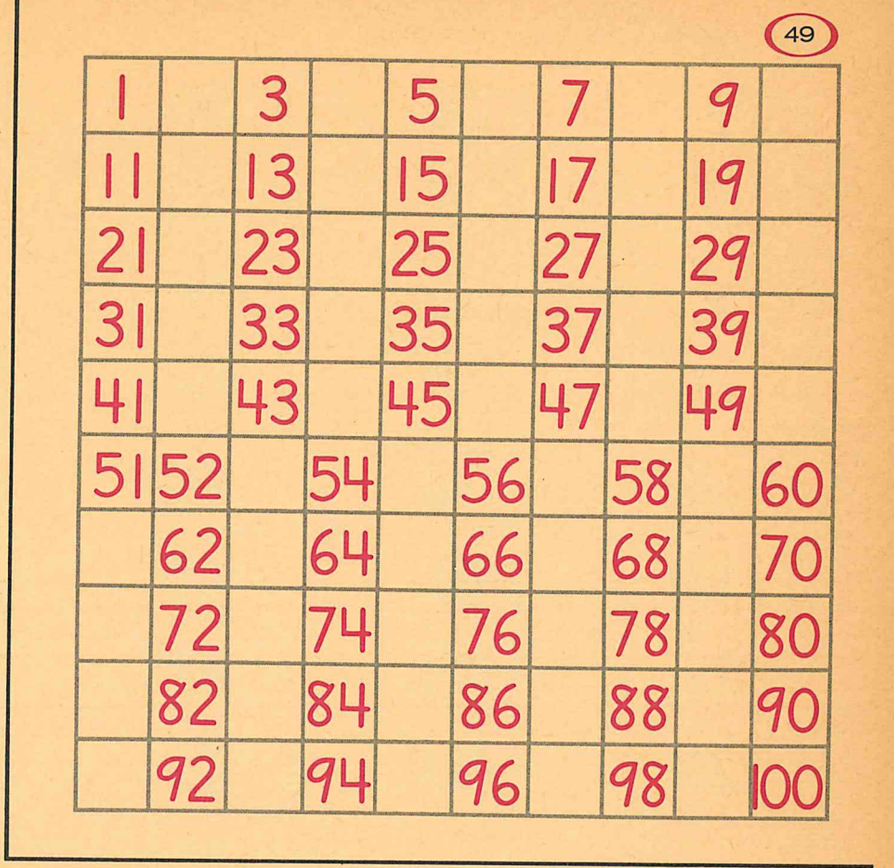
At the next recess game period let the children who have odd numbers form a circle for a game of dodge ball. Let those who have even numbers form a group within the circle.

Procedure

Open your books to page 49.

Have the children write the missing numerals with blue crayon. **Read each numeral and think of which numeral comes next. Write good numerals.** Let the class work independently and give help only when it is absolutely necessary.

When the children have finished the page, have several children take turns reading their answers as each child checks his own paper. **What kind of numbers did we write on the top part of the page?** [even] **What kind did we write on the bottom part?**



See if the children can form any generalizations about odd and even numbers.

Extended Activity

Prepare worksheets with several exercises like the following:

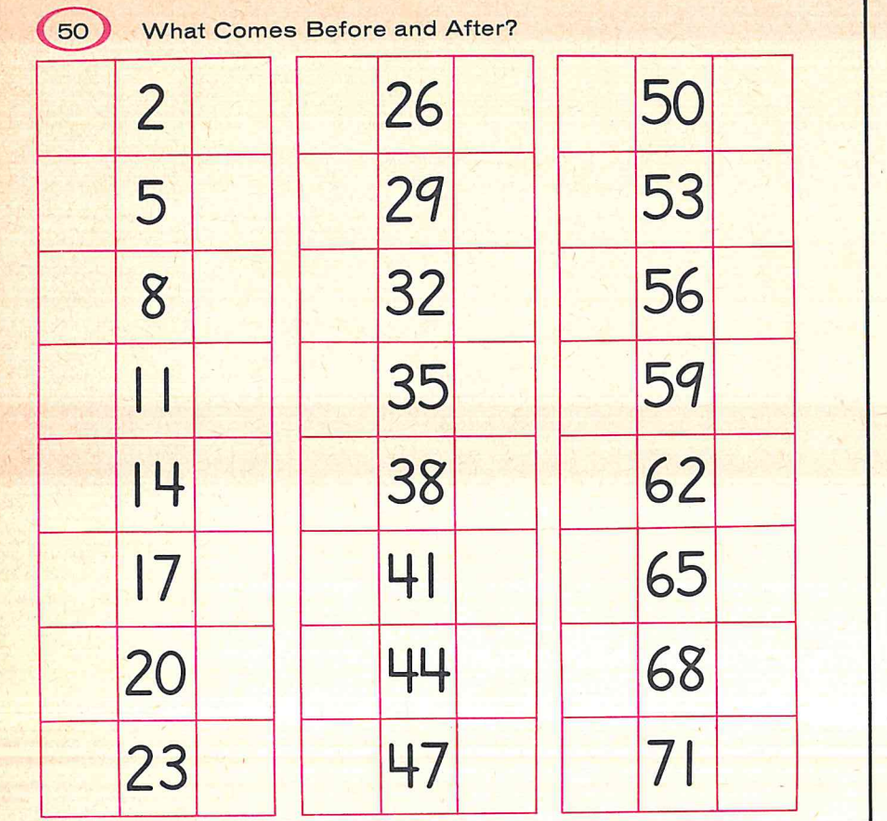
Circle each odd number and the letter above it. The first one is done for you.

(A	W	B		A	I	X		G	L	B		Z	E	T
1)	2	3		4	5	6		7	8	9		10	11	12

A	V	R												
13	14	15												

Write the letters you have circled on these lines. Keep them in order

A B I G B E A R



50

Purpose

To give practice in writing the numerals which come before and after a given numeral.

Vocabulary

Before, after, between, below.

Materials

Hundred chart, squared newsprint.

Developmental Activity

Today we are going to work with numbers that come before or after a certain number. Let's see how many of you can do this using the hundred chart. First, we will say our answers, later we will write them.

I am thinking of a number. It is 3. What number comes before it? [2] What number comes after it? [4] Let us try another. Who can tell me the number which comes before 11? [10] Who can tell me the number that comes after 11? [12] We can say that 11 comes between 10 and 12.

Continue with similar oral work if children seem to need it.

Procedure

Open your books to page 50.

Who can read the title of this page? [What Comes Before and After?] **Point to the column of numerals on the left-hand side of the page. What is the first numeral?** [2] **Who can tell me what comes before 2?** [1] **Who can tell me what comes after 2?** [3] **Can you put 1 and 3 in their correct places? In which box should the 1 be written?** [first at the left] **Where does the 3 go?** [in the box after the 2]

Now let's try another. What is the numeral which is below 2? [5] **Who can tell me what comes before 5?** [4] **Who can tell me what comes after 5?** [6] **Write each numeral in its proper place.**

If children understand this, they will be eager to go ahead at their own rate. This should be encouraged. If children need additional help, use the hundred chart or the chalkboard or both. A child's difficulty may be caused by failure to recognize a numeral or by inability to write the numeral. Practice at the chalkboard may be needed before the group continues with the page.

Extended Activity

Give each child a sheet of squared newsprint, similar to the book page. Ask him to put a numeral from 2 to 99 in the center of each series of three squares. (Point to this.) Then have him write the numeral that comes before and the numeral that comes after. Check these papers for accuracy before children take them home.

If the group has had experiences with numbers larger than 100, let them use these numbers as the "between" numbers.

51

Purpose

To give practice in writing the numeral which comes between two given numerals.

Vocabulary

Between, comes after, comes before, below.

Materials

Squared sheets of newsprint, hundred chart.

Developmental Activity

On the chalkboard write: 5 __ 7. Ask what numeral comes between 5 and 7. Repeat this with 8 __ 10, 12 __ 14, 19 __ 21.

Then write a series of numerals on the chalkboard, for example:

17 __ 19
20 __ 22
23 __ 25
26 __ 28
29 __ 31

Have the children tell which numeral comes between each two numerals. Have a child write in each numeral.

The children may work with several such series before doing page 51.

Procedure

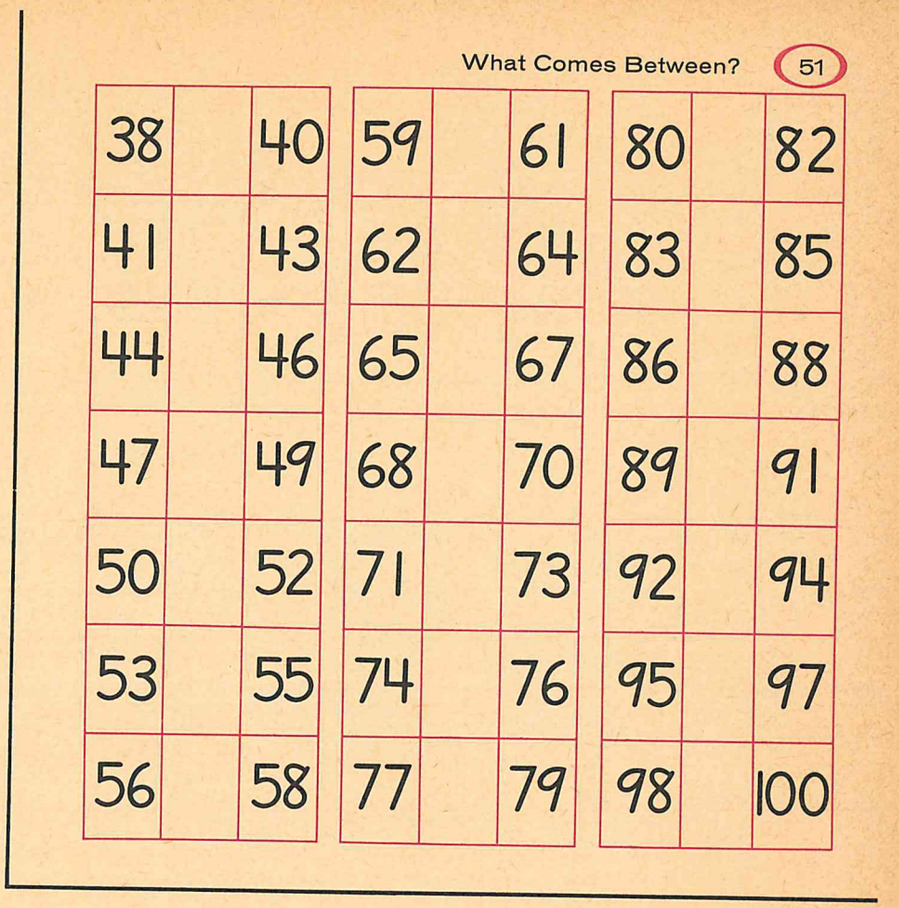
Open your books to page 51.

Have the children do this page without help from you. If any pupils are having difficulty, ask where they might find which numeral comes between two numerals. [hundred chart, book pages]

If you wish to discuss part of this page with the group: **What is the first numeral in the left-hand corner of the page?** [38] **What is the next numeral that is written in the first row?** [40] **Who knows what numeral comes after 38 and before 40? Everyone who knows may write it.** At this point help any child who is uncertain by referring him to the hundred chart.

Now let us look at the numeral below 38. What is it? [41] **What other numeral do you see in the same row?** [43] **What numeral comes between 41 and 43? Everyone who knows may write it.**

Let us try one more. What numeral comes after 44 and before 46? You may write it.



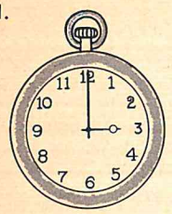
Extended Activity

Give the children squared paper. Ask them to write sets of "what-comes-between" numerals, for example, have them write 10 __ 12 in crayon. Then have them go back and write in pencil each numeral which comes between.

Check the children's work before these papers are sent home.

52 A Sunday Afternoon Drive

1.



At what time did the family leave home?

_____p.m.

2.

How much gas did they buy?

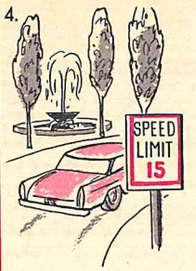
_____

3.

How much oil did they buy?

_____

4.



How fast could they drive in the park?

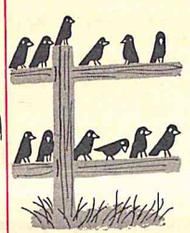
_____

5.

How fast could they drive on the highway?

_____

6.

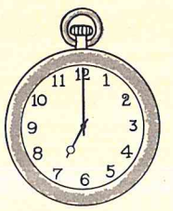


On the fence they saw _____ blackbirds.

7.

At a store Father bought _____ of ice cream.

8.



The family came home at _____p.m.

52

Purpose

To introduce children to the reading of problems. To develop the ability to use pictures to find information for solving problems.

Materials

Clock, gallon can, several different quart containers, a pint measure, "Speed Limit" signs sketched on the chalkboard.

Vocabulary

Gallon, quart, pint and abbreviations—gal., qt., and pt. Miles.

Developmental Activity

This page, and all pages which require the children to read and solve problems, should be done as a small group activity. Working with small groups will enable the teacher to help those who have reading difficulties.

Review telling time on the hour.

Review the gallon, pint, and quart and teach the abbreviations for these.

Discuss what is meant by speed limit. **Why are people allowed to drive faster on some streets and roads than on others?**

Procedure

Let's open our books to page 52.

What is the title of this page? [A Sunday Afternoon Drive] **What do you think this page is about?**

Find the first picture in the first row. Who can read the words under it? How can we find the answer? [by reading the time on the clock] **Write the answer on the line. What does p.m. mean?**

Now look at the box with the numeral 2 in the top left-hand corner. This is problem number 2. Who can read it? Who can find the answer? Point to the place where it tells you. Do you think it is enough to write 5 as the answer? Bring out here that "5 gal." or "5 gallons" should be written to give the whole answer.

Look at the next box. Where is the family? Who can read the problem? What is the answer? [1 quart] **Point to the thing that told you the answer. How is quart written here?** [qt.] **"Qt." is the abbreviation or short way of writing quart. What should we write on the line?** [1 quart or 1 qt.]

Have a child read problem 4 aloud. **What thing in the picture tells you the answer? What does "speed limit" mean? What is the answer? Is it enough to write 15 on the line? What else should you write?** [miles]

Use a similar procedure for problem 5.

A fast group may be allowed to finish the page independently. If they do so, you should carefully check each child's work to be certain he has written complete answers, including words or abbreviations where needed. Make sure each abbreviation ends with a period.

Read problem 6. Write the correct answer. How did you find the answer?

You are now ready to do the seventh problem. Read it. Write the correct answer.

Everyone, read the last problem. Write in the correct answer. What time of day is 7:00 p.m.?

Extended Activity

Ask the children to read the entire page again. Encourage them to use it as the basis for an expanded story of their own. For example, once there was a family—Father and Mother, a boy, a girl, and a dog. One Sunday afternoon they went for a ride. They left home at 3 o'clock.

Have the children take this lesson home. Encourage them to tell their parents about "A Sunday Afternoon Drive."

53

Purpose

To extend the understanding of the numeral 11, the word eleven. To explore some of the ideas these symbols represent.

Materials

A set of 11 counters for each pupil.

Developmental Activity

Write the numeral 11 on the chalkboard. **Who can read this numeral?** [11] **What is another way to read it?** [1 ten and 1 one] **Arrange your counters on your desk in front of you to show 11.**

> Pupils will organize their 11-groups in various ways. Discuss some of the different patterns. This helps children see that the 11-group can be structured in many ways or that there are many possible groupings or patterns.

Which way of arranging our counters is correct? [all] Explore the patterns. **If we want to see how many quickly and easily, are some patterns better than others?** Discuss this.

Have other addition names for 11 made by arranging the counters in two groups not using the one-ten grouping.

List the names on the chalkboard as pupils give them.

Have pupils take turns writing number sentences for each of the addition facts in 11 on the chalkboard:

$9 + 2 = 11$	$8 + 3 = 11$	$7 + 4 = 11$	$6 + 5 = 11$
$2 + 9 = 11$	$3 + 8 = 11$	$4 + 7 = 11$	$5 + 6 = 11$

Work until all the addition pairs have been written.

Are there other names for 11 we can write? Explore some:

$10 + 1 = 11$	$4 + 4 + 3 = 11$	$2 + 2 + 2 + 5 = 11$
$1 + 10 = 11$	$1 + 1 + 9 = 11$	etc.

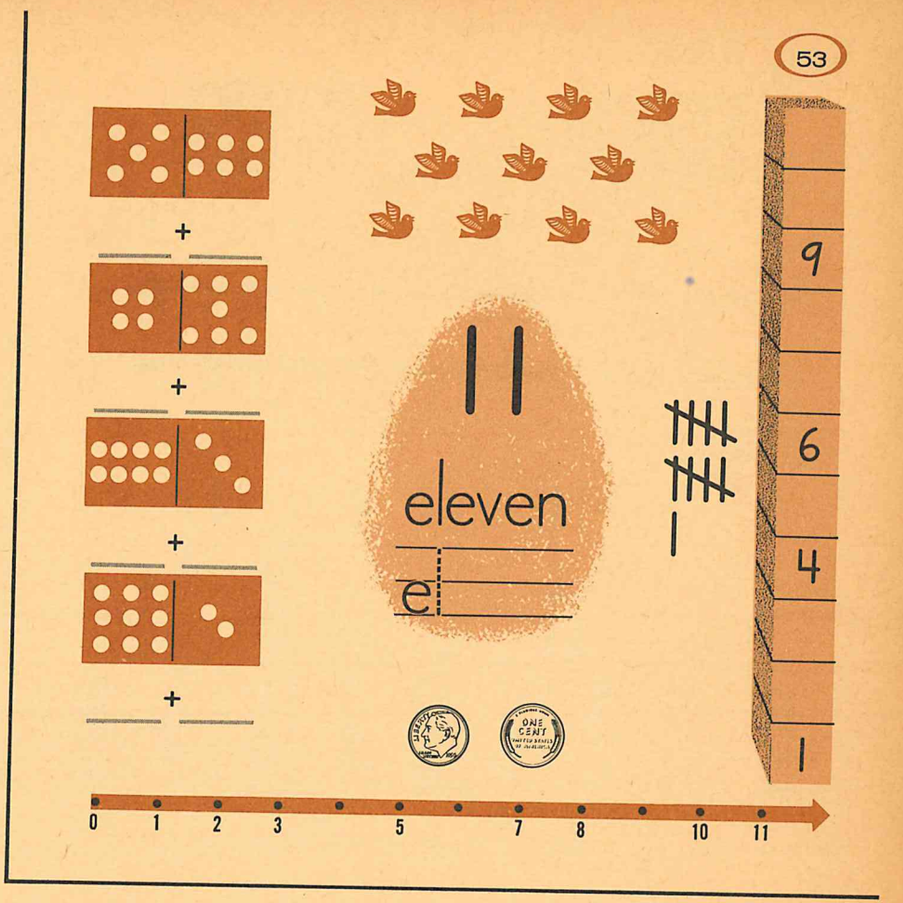
There are many more names possible than time will permit exploring. Stop when the group has a good grasp of the idea.

Procedure

Draw a ring around the numeral 11 in the middle of page 53.

Draw a ring around the word "eleven" in the middle of the page. Write the word "eleven" on the lines.

What number name for 11 does the first domino suggest? [5 + 6] **Write it on the lines under the domino. Five and 6 is another name for what?** [11] Repeat for each domino.



Find the birds. What number sentence does this picture suggest? [4 + 3 + 4 = 11] Explore with the group orally.

Find the tallies. How many are there? What number sentence do they suggest? Discuss.

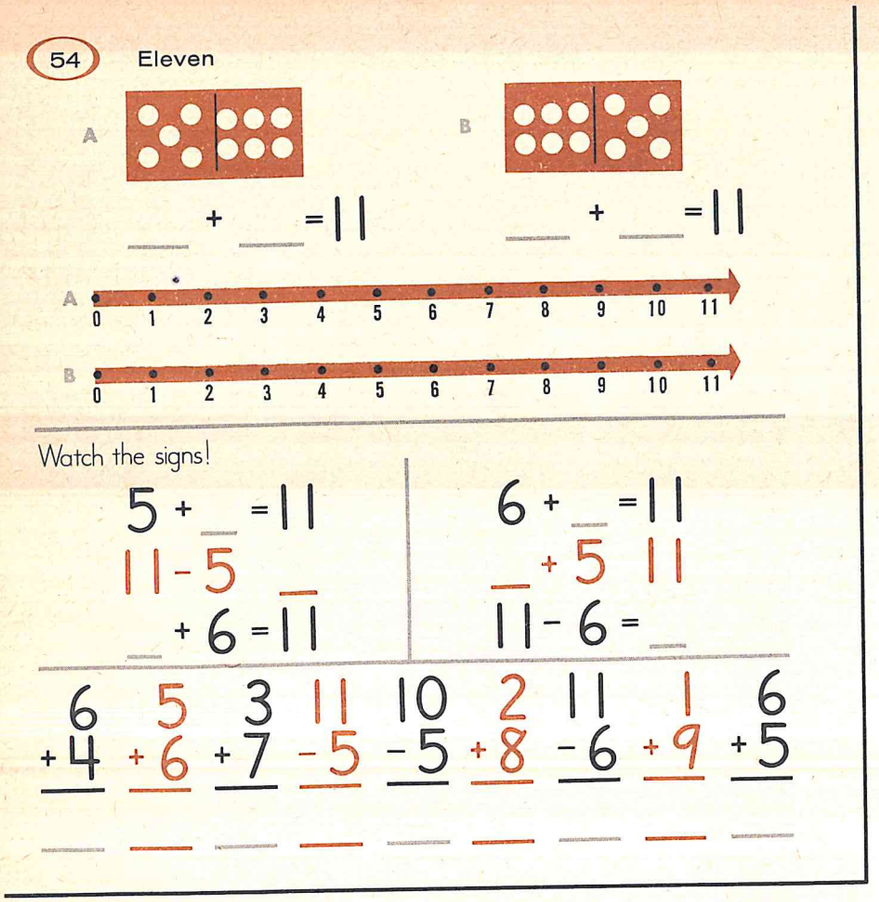
Find the money. How many pennies are there? [1] **How many dimes?** [1] **What number sentence do these coins suggest?**

> When we write a number sentence, we do not include money symbols or labels of any kind. Therefore, the number sentence is written: $10 + 1 = 11$ or $1 + 10 = 11$.

Find the tower of blocks. How many are there? [11] **Fill in the missing numerals. Find the number line. Write in the numerals.**

Extended Activity

Take out a set of 11 counters. Write all the addition facts you can show with them. (Use 6″ x 9″ ruled newsprint.) **There are 8!**



54

Purpose

To develop an understanding of the addition and subtraction relationships in 5, 6, and 11.

> Lessons of this type are excellent illustrations of the Commutative Law. Children will become aware that changing the order of the addends does not change the sum. They should be able to state this in their own words.

Materials

A set of 11 counters for each pupil, a chalkboard number line.

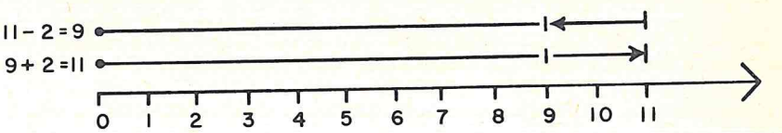
Developmental Activity

Take out 11 counters and place them in a row on your desk. How many other names for 11 can we make with two groups of the counters? Let's write the number sentence for each pair as it is suggested. Have individual pupils write the number sentence on the chalkboard as the others arrange their counters to show it. Eight number pairs should be discovered—4 direct and 4 reverses.

Next use the 11 counters to develop the subtraction facts in the 11-group. Have each pupil arrange his counters in a single row. Then have him take away 2, 3, 4, etc. The eight subtraction facts for 11 should be listed on the chalkboard as pupils suggest them.

> As each subtraction fact is developed, it is important to draw the related addition facts from the group and write them on the chalkboard. As an example, for $11 - 2 = 9$, the addition facts are $9 + 2 = 11$ and $2 + 9 = 11$.

The number line should be used to show the relationships.



When $11 - 6$ is developed, ask the children if they can tell the whole story about 11 and 5 and 6. **What other number sentences can we write?** Use the number line.

Procedure

Open your books to page 54.

What is the number word at the top of the page? [eleven]

Now look at the dominoes. How should we write the number sentence under the first one so that it tells the domino story? [$5 + 6 = 11$] **What number sentence should we write for the second domino?** [$6 + 5 = 11$]

Can you show the number sentence for domino A on number line A? Where should we show the number sentence for domino B?

Write the missing numerals in the number sentences on the bottom part of the page. What does it say above the sentences? [Watch the signs.]

Then do the addition and subtraction examples. If you need help, use your counters.

Write neatly.

Extended Activity

Have each pupil make a set of 3″ x 5″ flash cards for each of the addition and subtraction facts in 11. Encourage the children to practice them in their spare time by themselves or quietly with a neighbor.

55

Purpose

To extend understanding of the addition and subtraction relationships in 4, 7, and 11.

Materials

A set of 11 counters for each pupil, a chalkboard number line.

Developmental Activity

Take 11 counters and place them in a row. Separate them into a group or set of 4 and a group of 7. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$4 + 7 = 11$ $\quad 11 - 7 = 4$ $\quad 7 + \_ = 11$ $\quad \_ + 4 = 11$
$7 + 4 = 11$ $\quad 11 - 4 = 7$ $\quad 4 + \_ = 11$ $\quad \_ + 7 = 11$

Have various pupils show each of these on the number line at the chalkboard.

Procedure

Open your books to page 55.

What is the number word at the top of the page? [eleven] **What is the number sentence for the first or A domino?** [4 + 7 = 11] **Finish the number sentence under each domino.**

Next, can you show each of these number sentences on number lines A and B?

Then write the missing numerals in the number sentences on the bottom part of the page. Write neatly. You may use counters if you wish.

Work the addition and subtraction examples.

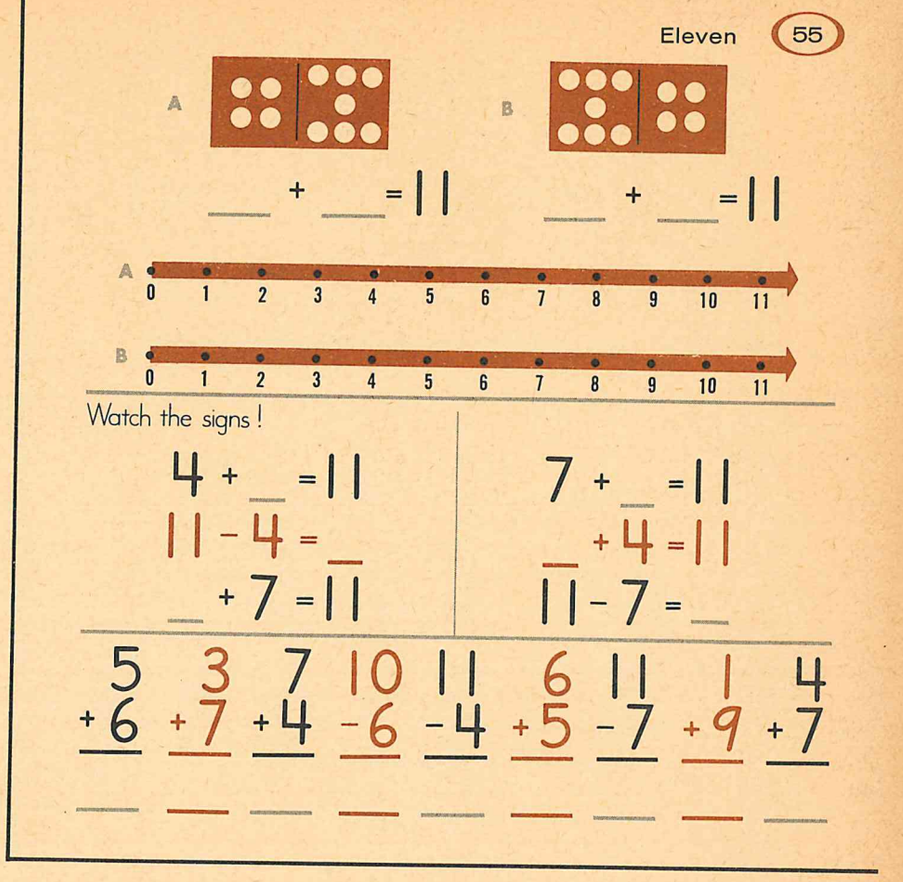
Extended Activity

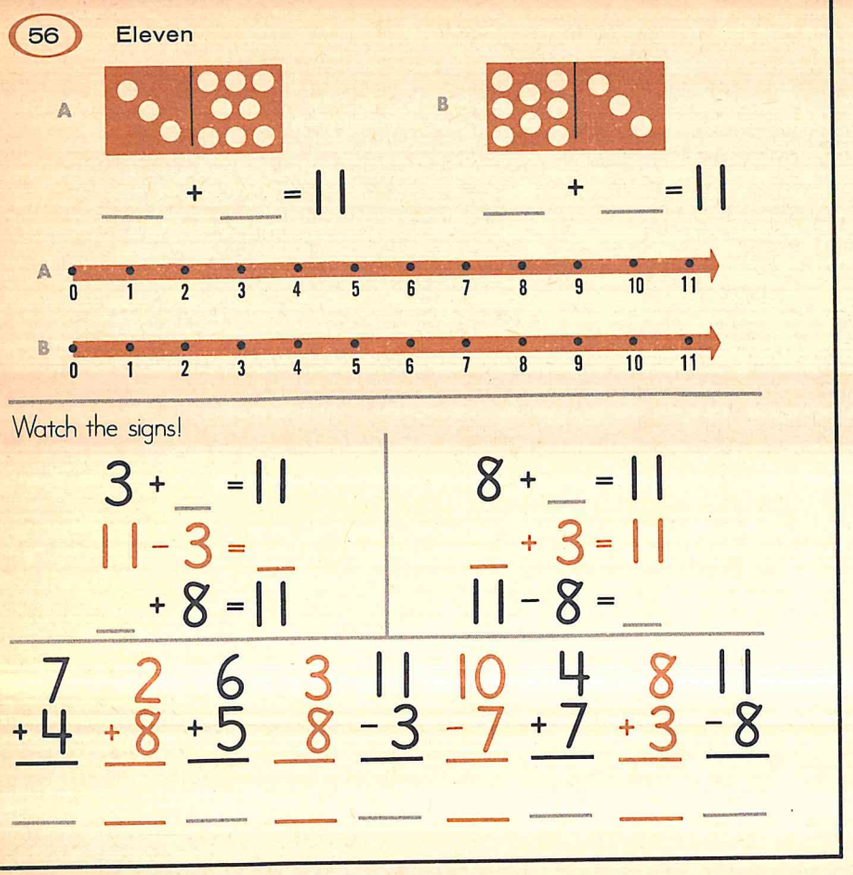
Put the number pair 2, 9 on the chalkboard. Have the pupils make up as many number sentences as they can using them. Sentences may be written on 6″ x 9″ ruled newsprint.

2, 9

$2 + 9 = 11$ $\quad 2 + \_ = 11$
$9 + 2 = 11$ $\quad 9 + \_ = 11$
$\_ + 9 = 11$ $\quad 11 - 2 = \_$
$\_ + 2 = 11$ $\quad 11 - 9 = \_$

Have each pupil write each open sentence with pencil, putting the solution in with crayon. This makes it possible to complete each sentence and at the same time to reveal a special relationship.





56

Purpose

To extend the understanding of addition and subtraction relationships in 3, 8, and 11.

Materials

A set of 11 counters for each pupil, a chalkboard number line.

Developmental Activity

Take 11 counters and place them in a row. Separate them into a set of 3 and a set of 8. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$3+8=\_$	$11-3=\_$	$3+\_=11$	$\_+3=11$
$8+3=\_$	$11-8=\_$	$8+\_=11$	$\_+8=11$

Have pupils "solve" each of the number sentences at the chalkboard by using the number line.

As this type of analysis and synthesis continues, pupils will become more and more aware of relationships, as well as more proficient in the art of analysis.

Procedure

Open your books to page 56.

What is the number word at the top of the page? [eleven]

What is the number sentence for the first domino? [3 + 8 = 11] **Write the missing numerals under each domino.**

Next, can you show each of these number sentences on number lines A and B?

On the bottom part of the page, write in the missing numerals. Then work the addition and subtraction examples. Write carefully. You may use counters to help.

Extended Activity

Put the number pair 4, 7 on the chalkboard. Have the pupils make up as many number sentences as they can with 4 and 7. Sentences may be written on 6″ x 9″ ruled newsprint.

4, 7

$4+7=\_$	$4+\_=11$
$7+4=\_$	$7+\_=11$
$\_+7=11$	$11-4=\_$
$\_+4=11$	$11-7=\_$

Have the pupils write the open sentences with pencil, putting the solution in with colored crayon. This makes it possible to complete each sentence and at the same time to reveal a special relationship between the numbers.

57

Purpose

To extend understanding of addition and subtraction relationships in 2, 9, and 11.

Materials

A set of 11 counters for each pupil, a chalkboard number line.

Developmental Activity

Take 11 counters and place them in a row. Separate them into a group of 2 and a group of 9. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$2+9=\_$	$11-2=\_$	$2+\_=11$	$\_+2=11$
$9+2=\_$	$11-9=\_$	$9+\_=11$	$\_+9=11$

Have pupils "solve" the number sentences at the chalkboard, using the number line.

Procedure

What is the number word at the top of page 57? [eleven]

What is the number sentence for the first domino? [2 + 9 = 11] **Write the missing numerals under each domino.**

Next, can you show each of these number sentences on number line A and number line B?

On the bottom part of the page, write in the missing numerals. Then work the addition and subtraction examples. Write carefully. You may use counters to help if you wish.

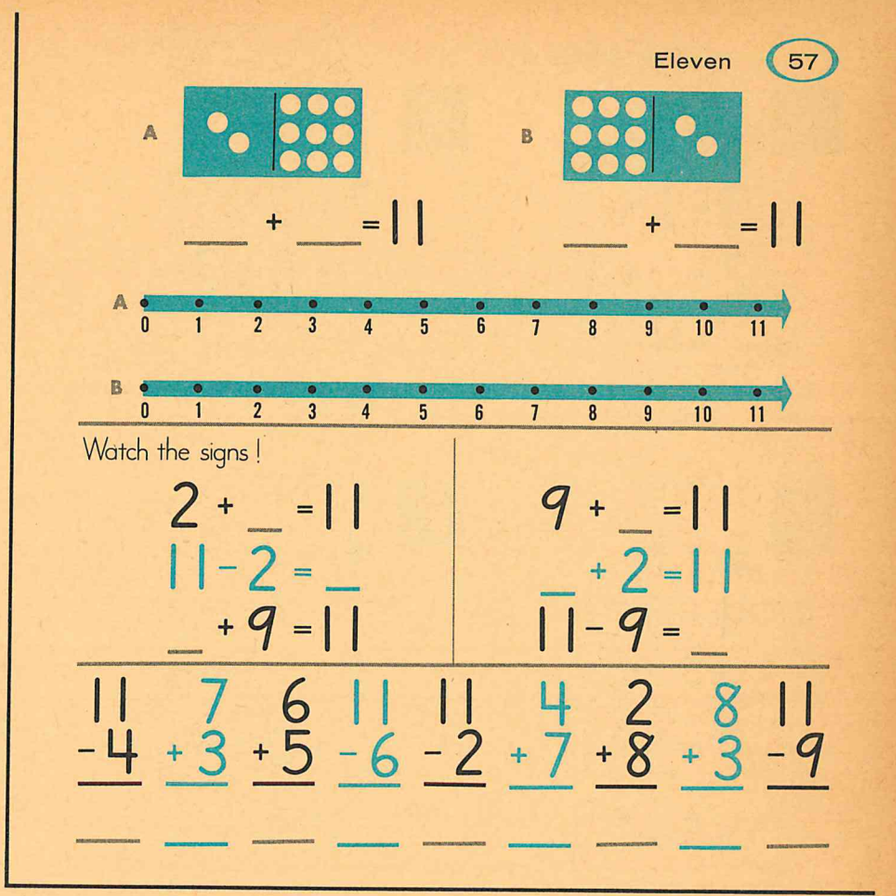
Extended Activity

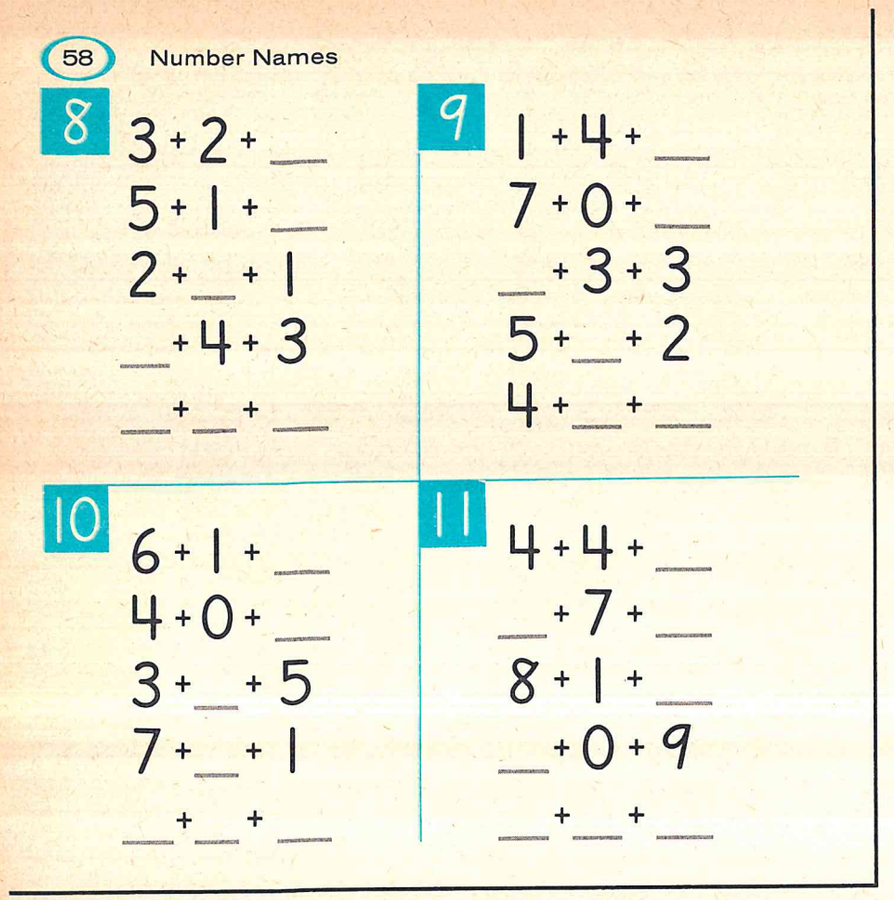
Put the number pair 3, 8 on the chalkboard. Have the children make up as many number sentences as they can using these numbers. Sentences may be written on 6″ x 9″ ruled newsprint.

3, 8

$3+8=\_$	$3+\_=11$
$8+3=\_$	$8+\_=11$
$\_+8=11$	$11-3=\_$
$\_+3=11$	$11-8=\_$

Have pupils write the open sentences with pencil, putting the solutions in with colored crayon. This makes it possible to complete each sentence and at the same time to reveal special relationships. Repeat for the number pair 5, 6.





58

Purpose

To find the missing addend in number names for 8, 9, 10, and 11. To practice three-addend addition.

Materials

A set of 11 counters for each pupil.

Developmental Activity

Take out a set of 11 counters. We have played a game in which we made up number names using three numerals. For example, another name for 10 is 3 + 2 + 5.

Put 10 of your counters in a row. Now put them into three groups so that they show a 3–2–5 pattern. How many other names for 10 can we make, using three numerals? As number names are suggested, do two things. First, have the pupils use their counters to show the structure or grouping: 0 0 0 0 0 0 0 0 0 0. Second, have a pupil write the number sentence on the chalkboard: $3 + 2 + 5 = 10$. As many solutions as possible should be organized on the chalkboard. Some are:

1 + 1 + 8	2 + 1 + 7	3 + 1 + 6	4 + 1 + 5
1 + 2 + 7	2 + 2 + 6	3 + 2 + 5	4 + 2 + 4
1 + 3 + 6	2 + 3 + 5	Etc.	Etc.
1 + 4 + 5	2 + 4 + 4		
1 + 5 + 4	2 + 5 + 3		
1 + 6 + 3	2 + 6 + 2		
1 + 7 + 2	2 + 7 + 1		

Encourage pupils to suggest solutions that are related. These are variations of previous suggestions.

If zero is suggested as one of the addends, a very large new set of solutions becomes possible. However, unless the children suggest its use, do not introduce zero at this time. Organizing and reorganizing counters will not produce solutions with zero.

Procedure

Open your books to page 58.

In each of the boxes you will see a set of unfinished examples. Can you finish each one so that it is another name for the number in the top corner of the box? What numeral would we write to finish the first one? [3] **We have worked examples just like these, haven't we? Go ahead and finish the page. Work carefully. Write neatly.**

Circulate and give help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **Write the numeral 10 at the top of the page. Write as many other names for 10 as you can. Use either two or three numerals with addition.**

59

Purpose

To check mastery of the addition and subtraction facts in 9, 10, and 11.

Materials

A set of 11 counters for each pupil.

Procedure

Open your books to page 59.

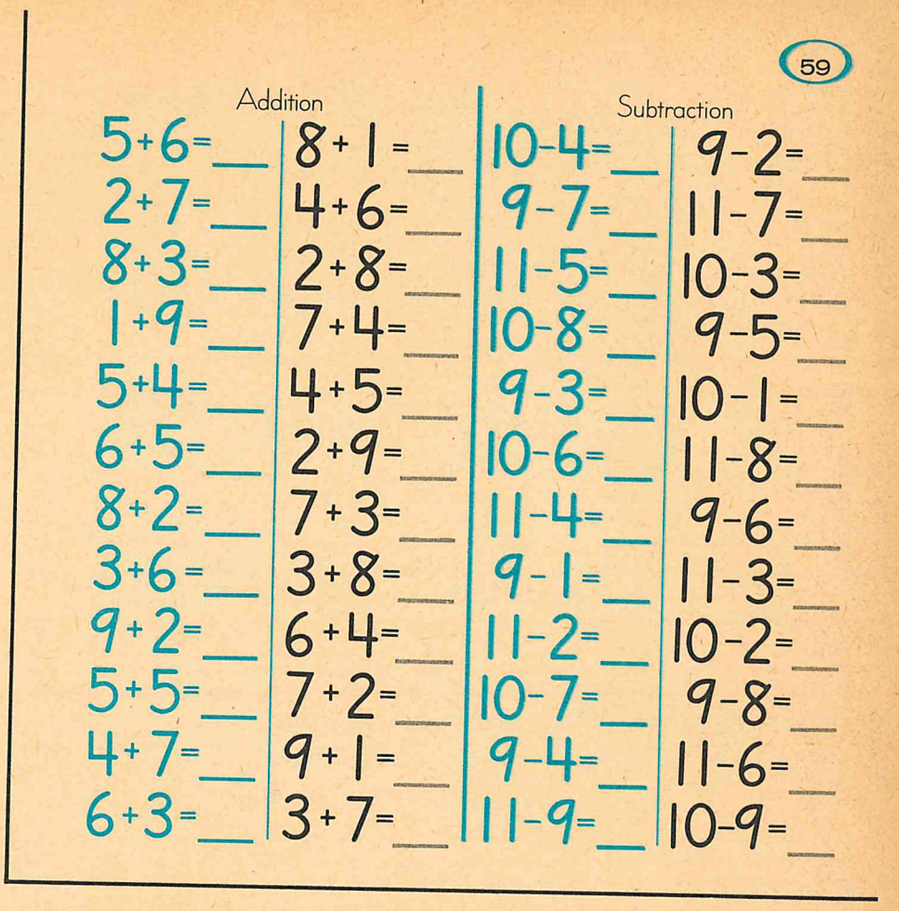
On the line after each example, write the answer to the example. The left half of the page is _____. [addition] Point to the word "addition." The right half of the page is _____. [subtraction] Point to the word "subtraction." Work neatly. Check your answers with counters.

Circulate and help as needed.

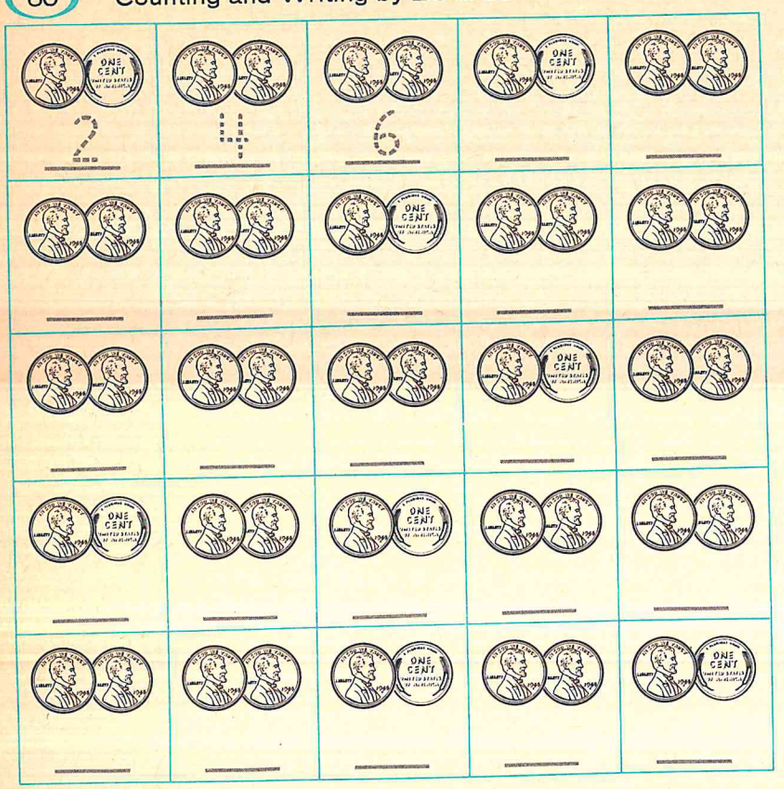
Extended Activity

Have the pupils take each addition number pair and change one of the numerals to make a new number name using three numerals. For example, 6 + 3 may be changed to 6 + 2 + 1 or 6 + 1 + 2.

Take time for group evaluation of the work.



60 Counting and Writing by 2's to 50



60

Purpose

To review counting by 2's to 50 and to learn to write the appropriate numerals.

Vocabulary

Two, four, six, eight, ten, twelve, fourteen, sixteen, eighteen, twenty, twenty-two, twenty-four, twenty-six, twenty-eight, thirty, thirty-two, thirty-four, thirty-six, thirty-eight, forty, forty-two, forty-four, forty-six, forty-eight, fifty.

Materials

Counters, blocks, counting beads, books, chairs, pennies, chalk, hundred board. squared newsprint.

Developmental Activity

The children have had some experience in counting by 2's. You may provide for review by using a variety of materials, such as counters, blocks, books, coins, or discs. You may give the children discs. Have the children group the discs in sets of 2. Take time for the children to count by 2's as they point to each set of 2 discs.

Refer the children to the hundred chart. Ask a child to count by 2's to 50. As he says each number, have him point to it on the hundred chart. Have several children do this.

Procedure

Now open your books to page 60.

Talk about the array of pennies on the page. Have the children write the numerals to show that, in counting the pennies, 2 more have been added each time. Continue the page until all the even numerals from 2 to 50 have been written. To be certain the children are writing their numerals correctly, you should directly supervise this lesson. It would be helpful to work in small groups.

Extended Activity

Give the children newsprint and ask them to write the even numerals from 2 to 50. Make this an independent activity. Check all papers before sending them home.

61

Purpose

To learn to count by 2's from 52 to 100; to learn to write the appropriate numerals.

Vocabulary

Fifty-two, fifty-four, fifty-six, fifty-eight, sixty, sixty-two, sixty-four, sixty-six, sixty-eight, seventy, seventy-two, seventy-four, etc.

Materials

Squared newsprint 9″ x 12″, counters, discs, pennies, hundred chart.

Developmental Activity

Have 100 counters, discs, pennies, or other similar objects available. Call on a child to count them by 2's. When he reaches 50, stop him. Ask whether anyone knows what comes after 50 when we count by 2's. What comes after 52? after 54? Have a child try counting from 54 to 100. If he has difficulty, tell him that we add 2 more each time we count by 2's. Let several children take turns counting objects by 2's. Tell them to pretend they have just counted 50 of whatever object they are counting. Have them continue counting from there.

Refer to the hundred chart. Begin with 52 and point to the even numerals from 52 to 100. Encourage the children to repeat each numeral as you point to it on the chart. Change the procedure by letting various children point to the numerals while others say them.

Procedure

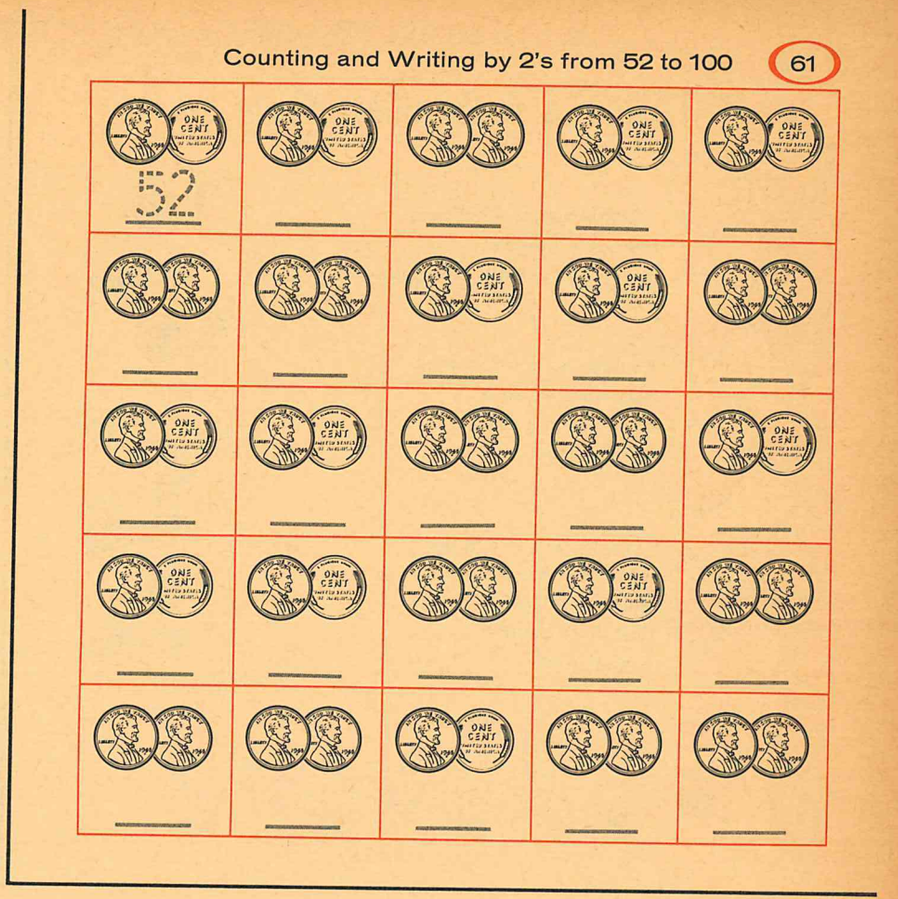
Now open your books to page 61.

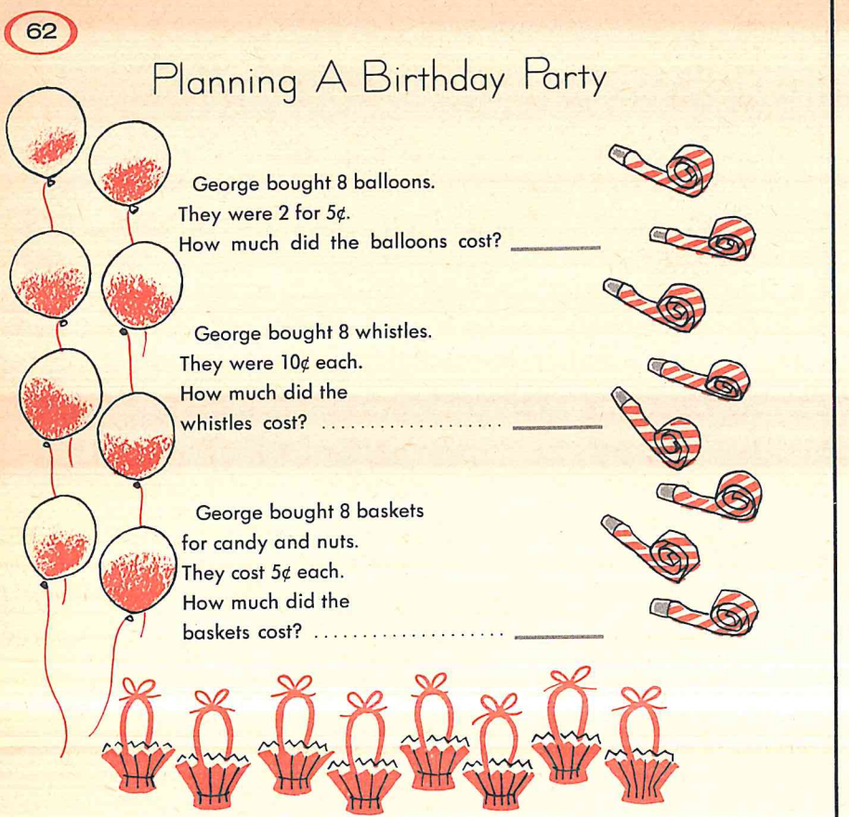
We have counted 50 pennies. We still have more to count. Point to the numeral under the first 2 pennies. What is it? Trace it. Ask the children what numeral goes in the next box. Have them write it.

If the children did not find page 60 difficult, let them work this page independently. However, be alert to how the children are writing their numerals. Correct any wrong techniques and give help to those who need it. Have those who find the number sequence difficult add 2 more to each number. You may refer them to the hundred chart, also.

Extended Activity

The children may be given squared newsprint. Ask them to draw 2 of the same simple objects in each square. Then have them count the objects by 2's starting at 52. The counting numerals should be written under each set of objects as on the book page. Check the papers for accuracy before they are taken home.




62
Planning A Birthday Party
George bought 8 balloons.
They were 2 for 5¢.
How much did the balloons cost? _____
George bought 8 whistles.
They were 10¢ each.
How much did the
whistles cost? ..... _____
George bought 8 baskets
for candy and nuts.
They cost 5¢ each.
How much did the
baskets cost? ..... _____

62

Purpose

To solve simple problems. To review making purchases with nickels and dimes.

Vocabulary

Bought, cost, each, how much.

Materials

Balloons, whistles, and baskets or drawings of them on the chalkboard or pictures of these objects. Real coins or toy money.

Developmental Activity

Work with a small group.

Draw 8 balloons on the chalkboard. Write "2 for 5¢" above them. Have the children count the balloons by 2's. As they count the first two, have them say "Five cents," the next two, "Ten cents," etc. Repeat several times if necessary.

If 2 balloons cost 5 cents, how much are 4 balloons? 6 balloons?

Also, have the children count by 5's to 100 and by 10's to 100 several times.

Then read this story: **George was having a birthday soon. He was going to be 8 years old. His mother told him he might invite 7 of his friends to his birthday party. How many children would there be at the party all together?**

George and his mother made out a shopping list of things to buy for the party. George wanted whistles, balloons, and small baskets. His mother told him he might do the shopping by himself.

Procedure

Have the children open their books to page 62. Continue the story. **These are the things George bought for the party.**

Who would like to read the first problem? What does it tell you? [George bought 8 balloons.] **What else?** [They were 2 for 5¢.] **Which sentence is different from the others?** [the last] **How?** [It asks a question.] **What does it ask? Listen carefully to see if you can give the answer.** Discuss how the children found the answer. If they have difficulty arriving at it, have them count the balloons again by 2's, saying "Five cents" for the first two, "Ten cents" for the next two. . . . Have the children write the 20¢ on the line. Be sure they write the ¢ sign. Help those who have trouble writing it.

Have a child read the next problem aloud. **What does the problem tell you? What does it ask you? Who knows the answer? How did you find the answer?** If the children need help, have them count the whistles. They should say "Ten cents" as they point to the first whistle, "Twenty cents" for the second, etc. **Now write the answer on the line.** Check to see that the children have written the numerals and ¢ sign correctly. Ask if anyone knows how many dimes you need to make eighty cents.

Who can read the last problem? What does this problem tell you? Find the sentence that is different from the others. What does it ask? Think of a good way to find the answer. When you know the answer, write it. Give help to individuals if it is needed. Check on how the children have written the answer. Have the problem reread and the answer given.

Extended Activity

Have the children suggest other things that George might have bought for his party. Draw a picture of each thing as it is mentioned. Agree on a price for it and draw a price tag on each party item.

Have the children make up story problems about these party supplies.

63

Purpose

To extend understanding of the numeral 12 and the word twelve. To explore some of the ideas these symbols represent.

Materials

A set of 12 counters for each pupil.

Developmental Activity

Put the numeral 12 on the chalkboard. **Who can read this numeral? What is another way to read it?** [1 ten and 2 ones]

Today we are going to learn more about the idea of twelve. First, put 12 counters on your desk in front of you.

> Pupils will organize their 12-groups in various ways. Take time to discuss some of the different patterns. The purpose of this discussion is to see that the 12-group may be structured in many ways.

We can organize a number idea into subgroups. We can do this by arranging our counters in many ways. How many names for 12 can we make by putting our counters into two groups? As pupils suggest number sentences, write them on the chalkboard:

$9+3=12$ $8+4=12$ $7+5=12$ $6+6=12$
$3+9=12$ $4+8=12$ $5+7=12$

Have each pupil "show" the idea with his counters. Work until all the addition pairs have been written.

Are there other names for 12 we can write? Explore as you did with the 11-group.

$2+10=12$
$4+4+4=12$
$1+2+9=12$
$2+2+8=12$

$10+2=12$
$3+3+3+3=12$
etc.

Stop when the group has a good understanding of the idea. Each number sentence should be written on the chalkboard as the pupils organize their counters into that pattern.

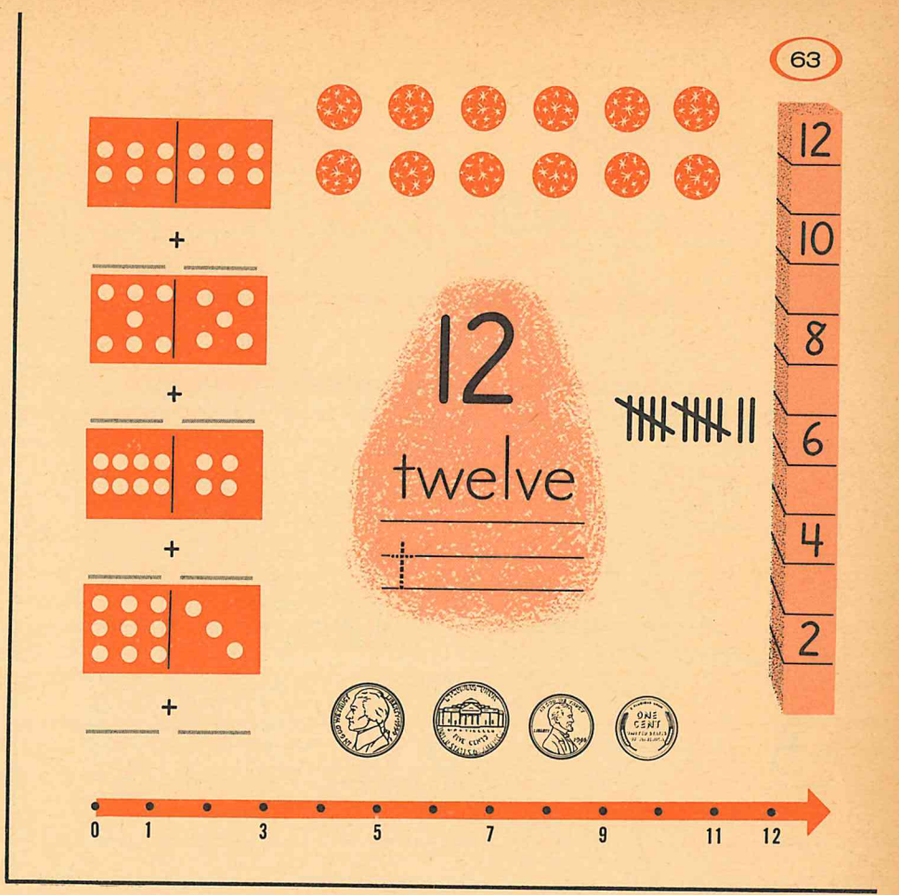
Procedure

Open your books to page 63.

Draw a ring around the numeral 12 in the middle of the page.

What is the word under the numeral 12? [twelve] **Write the word "twelve" on the lines.**

Find the column of dominoes. What number name for 12 does the first domino suggest? Write it on the lines under the domino. Six and 6 is another name for _____. [12] **What is the number name for the second domino?** [$7+5=12$] **Write it on the lines.** Follow this procedure for each domino.



Find the balls. What number sentence do they suggest? [$6+6=12$ or $2+2+2+2+2+2=12$] Explore orally.

Find the tallies. How many tally marks are there? [12] **What number sentence do they suggest?** [$5+5+2=12$] Discuss.

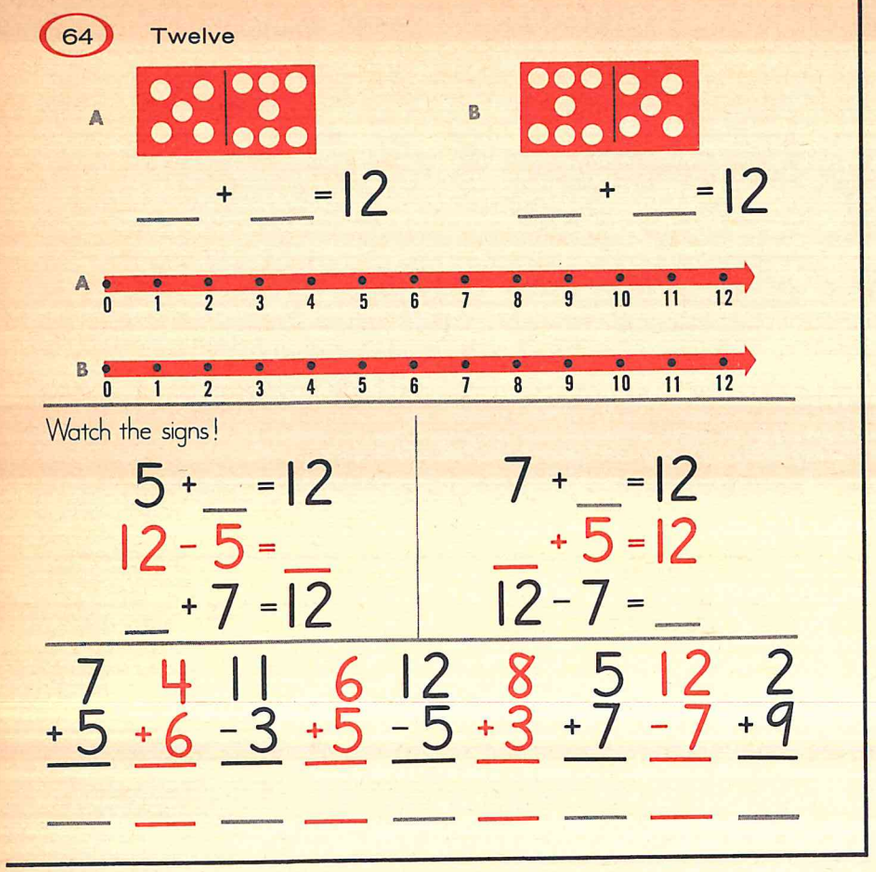
Find the money. How many nickels are there? [2] **How many pennies are there?** [2] **What number sentence about 12 do these coins suggest?** [$5+5+2=12$ or variations of this] Discuss.

Find the tower of blocks. How many blocks are there? [12] **Fill in the missing numerals. Write neatly.**

Find the number line. Write in the missing numerals. Are they odd or even?

Extended Activity

Take out a set of 12 counters. Write all the addition facts you can show with them. (Use 6″ x 9″ ruled newsprint.) **There are 7.**



64

Purpose

To develop an understanding of the addition and subtraction relationships in 5, 7, and 12.

Materials

A set of 12 counters for each pupil. A chalkboard number line.

Developmental Activity

Take out 12 counters. Place them in a row on your desk. How many other names for 12 can we make with two groups (sets) of counters? Let's write the number sentence for each pair as it is suggested. Have individual pupils write the number sentence for each pair on the chalkboard as the others arrange their counters to show it. Seven number pairs should be discovered:

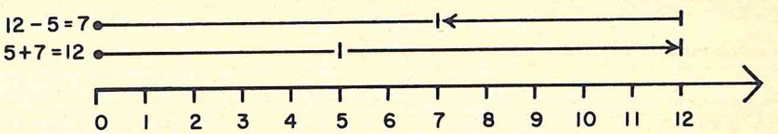
$9 + 3 = 12$ $\quad 8 + 4 = 12$ $\quad 7 + 5 = 12$ $\quad 6 + 6 = 12$
$3 + 9 = 12$ $\quad 4 + 8 = 12$ $\quad 5 + 7 = 12$

Use counters to develop the subtraction facts in 12. Have each pupil arrange his 12 counters in a single row. Have him take away or subtract 3, then 4, then 5, through 9 counters.

> As each subtraction fact is developed, it is important to draw from the group the related addition facts—for example, for $12 - 5 = 7$, the addition facts are $5 + 7 = 12$ and $7 + 5 = 12$.

When $12 - 5 = 7$ is developed, ask the children if they can tell the whole story about 12 and 5 and 7. **What other number sentences can we write?** List these on the chalkboard.

The number line can be used to show the relationships.



Do this also for $7 + 5$.

Procedure

Open your books to page 64.

What is the number word at the top of the page? [twelve]

Now look at the dominoes. How should we write the number sentence under domino A so that it tells the domino story? [$5 + 7 = 12$] **Write the number sentence for domino B, also.**

Now show each of these number sentences on number lines A and B.

On the bottom part of the page, write in the missing numeral for each number sentence. Watch the signs! Then work the addition and subtraction examples. Use counters to help if you want to. Write neatly.

Extended Activity

Have each pupil make a set of 3″ x 5″ flash cards for each of the addition and subtraction facts in 12. Encourage pupils to practice them in their spare time by themselves or quietly with a neighbor.

65

Purpose

To extend understanding of the addition and subtraction relationships in 4, 8, and 12.

Materials

A set of 12 counters for each pupil, a chalkboard number line.

Developmental Activity

Take 12 counters and place them in a row. Separate them into a set (group) of 4 and a set of 8. How many number sentences can we write about these sets? Through discussion develop all the possible statements. List them on the chalkboard:

$4 + 8 = 12$	$12 - 8 = 4$	$8 + \_\_ = 12$	$\_\_ + 8 = 12$
$8 + 4 = 12$	$12 - 4 = 8$	$4 + \_\_ = 12$	$\_\_ + 4 = 12$

Have various pupils show each of these number statements on the number line at the chalkboard.

Procedure

Open your books to page 65.

What is the number word at the top of the page? [twelve]

What is the number sentence for the first or A domino? [4 + 8 = 12] **Complete the number sentence under each of the dominoes. Then show these two sentences on number lines A and B.**

On the bottom part of the page write the missing numeral in each sentence. Work the addition and subtraction examples. You may use counters to help if you wish.

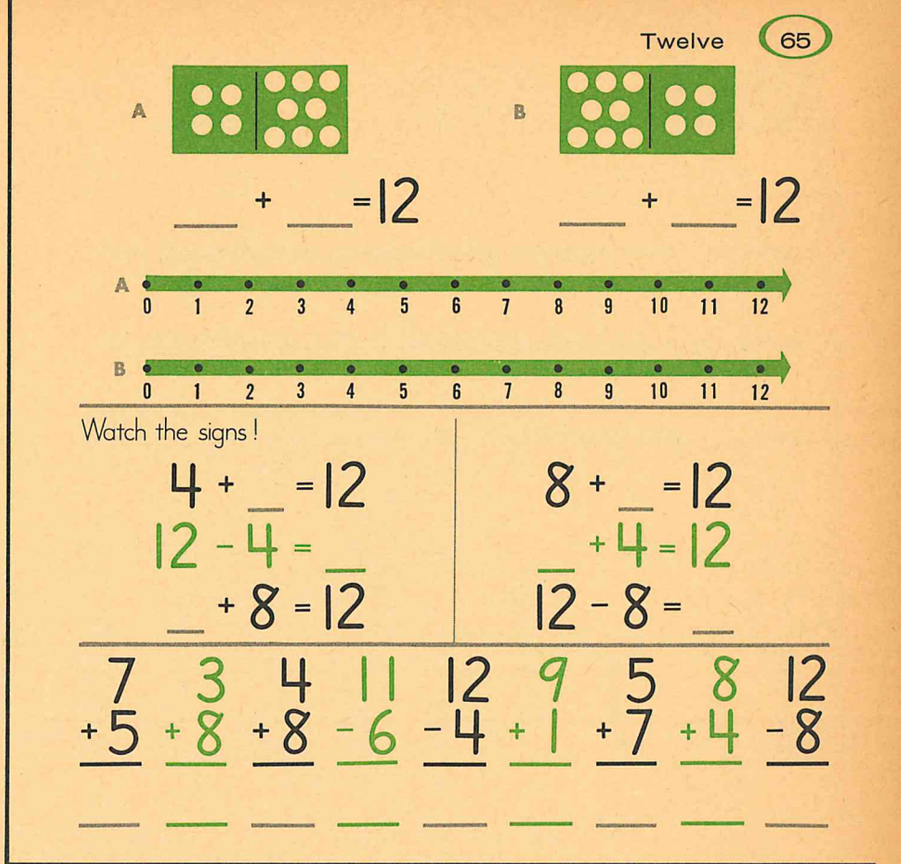
Extended Activity

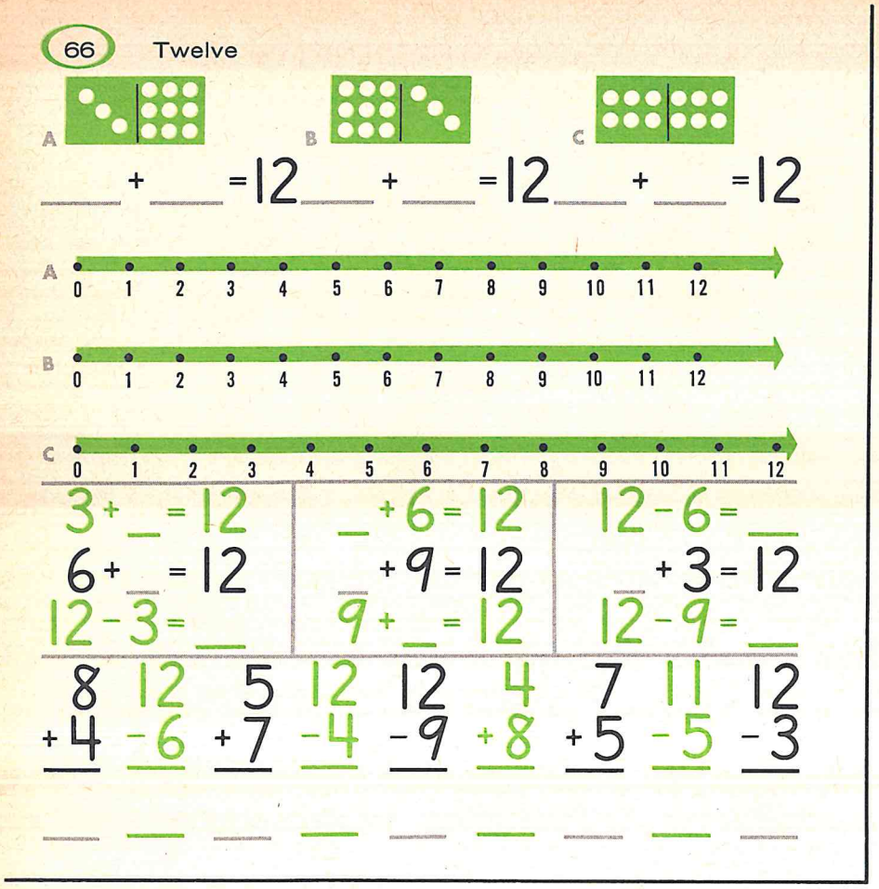
Put the number pair 4, 8 on the chalkboard. Have each pupil make up as many number sentences as he can by using these numbers. Sentences may be written on 6″ x 9″ ruled newsprint.

4, 8

$4 + 8 = \_\_$	$4 + \_\_ = 12$
$4 + \_\_ = 12$	$8 + \_\_ = 12$
$\_\_ + 8 = 12$	$12 - 4 = \_\_$
$\_\_ + 4 = 12$	$12 - 8 = \_\_$

Have pupils write the open sentence with pencil, putting the solution in with colored crayon. This makes it possible to complete each sentence and at the same time to reveal special relationships.





66

Purpose

To extend understanding of the addition and subtraction relationships in 3, 9, 12, and in 6, 6, 12.

Materials

A set of 12 counters for each pupil, a chalkboard number line.

Developmental Activity

Take 12 counters and place them in a row. Separate them into a set of 3 and a set of 9. How many different number sentences can we write about these sets? Through discussion develop all the possible statements:

$3 + 9 = 12$	$12 - 9 = 3$	$\_ + 9 = 12$	$9 + \_ = 12$
$9 + 3 = 12$	$12 - 3 = 9$	$\_ + 3 = 12$	$3 + \_ = 12$

Have pupils complete each of the number sentences on the chalkboard by using the number line.

Follow the same procedure with 6 and 6.

Procedure

Open your books to page 66.

What is the number word at the top of the page? [twelve]

What is the number sentence for the first domino? [$3 + 9 = 12$]

Write the missing numerals under each domino. Then show the number sentences on number lines A, B, and C.

On the bottom part of the page, write in the missing numerals. Work the addition and subtraction examples. You may use counters to help if you wish.

Extended Activity

Put the number pair 3, 9 on the chalkboard. Have the pupils make up as many number sentences as they can, using these numbers. Sentences may be written on 6″ x 9″ ruled newsprint.

3, 9

$3 + 9 = \_$	$3 + \_ = 12$
$9 + 3 = \_$	$9 + \_ = 12$
$\_ + 9 = 12$	$12 - 3 = \_$
$\_ + 3 = 12$	$12 - 9 = \_$

Have the pupils write the open sentences with pencil, putting the solutions in with crayon.

Do this for 6 and 6, also.

67

Purpose

To extend concepts for 9, 10, 11, and 12, using three addends.

Materials

A set of 12 counters for each pupil.

Developmental Activity

Take out a set of 12 counters. Remember the game in which we made up number names using three numbers? For example, with 12 we used 5 + 5 + 2. Put your counters into three groups to make a 5–5–2 pattern. How many other names for 12 can we make, using three groups? As number names are suggested, do two things:

(1) Have the pupils show the name with their counters.

(2) Have a pupil write the number sentence on the chalkboard. As many solutions as possible should be organized on the chalkboard. Some are:

$1 + 2 + 9 = 12$
$1 + 3 + 8 = 12$
$1 + 4 + 7 = 12$
$1 + 5 + 6 = 12$

Encourage pupils to suggest solutions that are related; that is, solutions that are variations of previous sentences.

If zero is suggested as an addend, a very large new set of solutions becomes possible. However, if the pupils do not suggest using zero, then do not use it in this developmental work.

Procedure

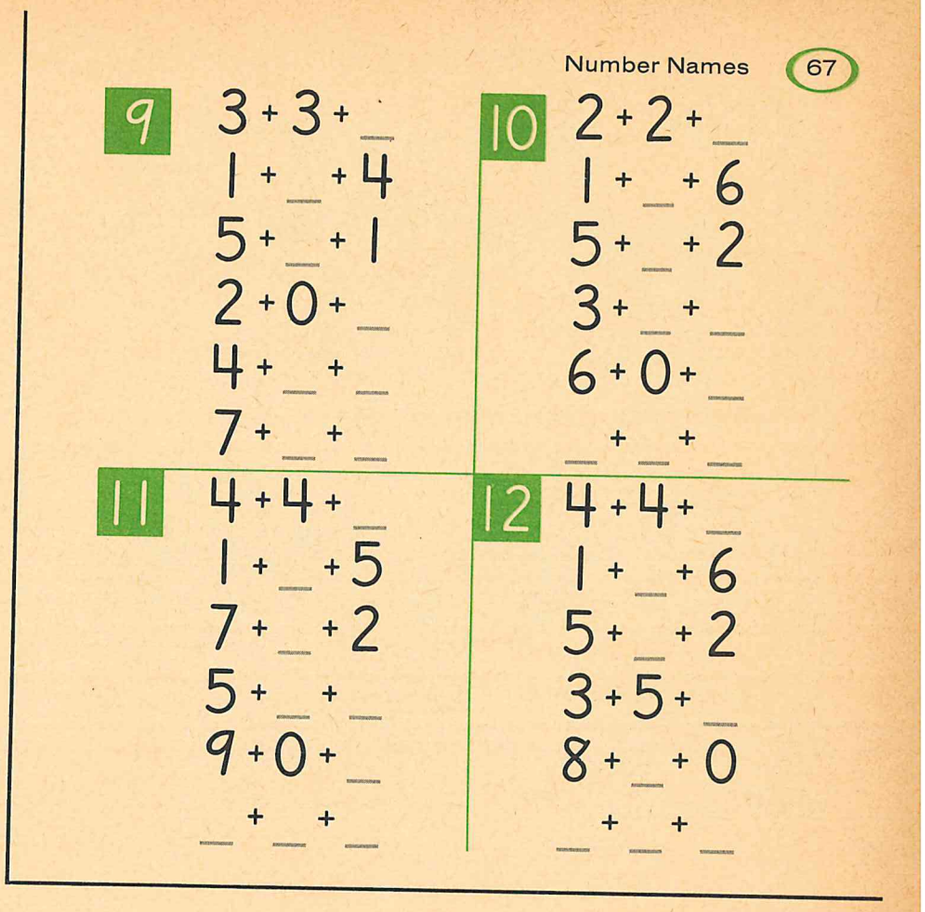
Open your books to page 67.

In each of the boxes you will see a set of examples which are not finished. Complete each one so that it is another name for the number at the top of the box. These are like others we have been working. Work carefully.

Circulate and help as needed.

Extended Activity

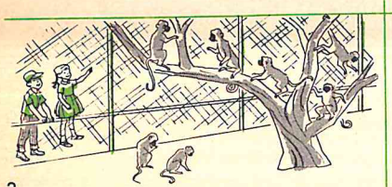
Pass out 6″ x 9″ ruled newsprint. **Write the numeral 11 at the top of your page. Write as many other names for 11 as you can. Use sets of either two or three numerals with addition. You might use 7 + 4 = 11 or 5 + 4 + 2 = 11.**



68 A Morning at the Park

1.
One morning Jane and Jim went to the park. They fed the squirrels. Five squirrels were eating. Two other squirrels were not eating. How many squirrels were there all together? ..... ___
Write the number sentence.

2.
They also fed the pigeons. Four pigeons were eating. Three more pigeons were walking around. How many pigeons were there all together? ..... ___
Write the number sentence.



3.
Then the children watched the monkeys. Five monkeys were in the tree. Two monkeys were on the ground. How many more monkeys were in the tree than on the ground? ..... ___
Write the number sentence.

4.
Jane and Jim waited for a turn on the merry-go-round. There were 12 horses. Only 3 horses had children riding on them. How many horses did not have riders? ..... ___
Write the number sentence.

What does the problem tell you? Draw from the children all the pertinent information given in the problem. **Which sentence is different from the others?** [How many squirrels were there all together?] **How is it different?** [It is a question.] **What does it ask you? How would you answer it? Write the answer.**

What number sentence should we write? [$2 + 5 = 7$ or $5 + 2 = 7$] **How did you get this number sentence?**

Use a similar procedure for problems 2 and 3.

Have problem 4 read aloud. **What does the problem tell you? What sentence is not like the others? What does it ask you? What is the answer? Could you find this answer by looking at the picture? Why not?**

Now write the number sentence for this problem.

If problem 4 gives the children difficulty, have them use counters or manipulative materials to find its answer.

Extended Activity

From your picture file select other pictures of park experiences and encourage children to make up verbal story problems about them. Modern storybooks and readers also have excellent pictures which may be used for this purpose. Some of these problems may be written on the chalkboard for others to read and solve. By the end of the year the very able children should be able to write original problems.

68

Purpose

To give practice in reading and solving story problems.

Vocabulary

All together, were left, how many more.

Developmental Activity

Work with small groups.

How many of you have spent some time at a park? What were some of the things you did? Take time to discuss.

Procedure

Open your books to page 68.

What is the title of this page? Can you find out who spent a morning at the park? [Jane and Jim]

What was the first thing Jane and Jim did when they arrived at the park? Let's read problem 1 to find out. Call on a child to read the entire problem except: "Write the number sentence."

69

Purpose

To develop an informal awareness of some of the special properties of one.

Materials

A set of 10 counters for each pupil.

Developmental Activity

Have pupils do some oral counting. Start with 89—90—91—92. Have the children continue each of the following series: 124—125, 141—142, and 178—179. **How is counting by 1's like adding?** (The purpose of this question is to develop the generalization that 1 more is the next number in counting.) Accept informal responses, such as "One more tells the next number."

What happens when we count backwards by 1's? [It tells the number before. It is the number in front of the one you start with, etc.] Have the group orally count backwards from 20 to 1.

Procedure

Open your books to page 69.

Look at the row with numeral 1 in the square. Point to it. Who can read what is written next to the 1? [Count by 1's.] **Rows A and B are easy. Go ahead and write in the numerals. Use counters if you wish. Look up at me when you are ready to go on.**

Now look at the row with the numeral 2 in the square. Read the sentence. [Count backwards by 1's.] **The first numeral is written in and the next numeral is started for you. Trace over the 9. Can you write in the other numerals on each line?**

Point to the square with the numeral 3 in it. Read the sentence. [Add 1 to each number.] **What is the first number?** [1] **Add 1 to it. What is the answer?** [2] **Write it on the line next to the 1. What is the answer to the next one? Do the first row. When you have finished, work the next row.**

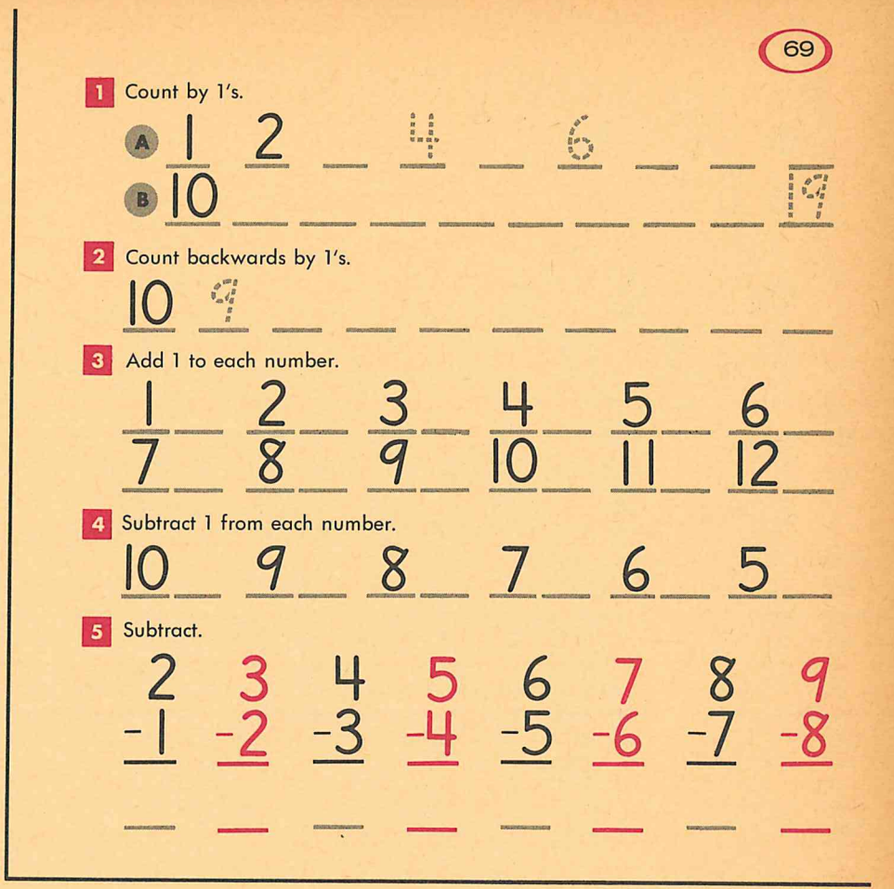
Look at the row with the numeral 4 in the square. Read the sentence. [Subtract 1 from each number.] **What is the answer to the first one?** [9] **Where should you write the answer? What is the answer to the next one?** [8]

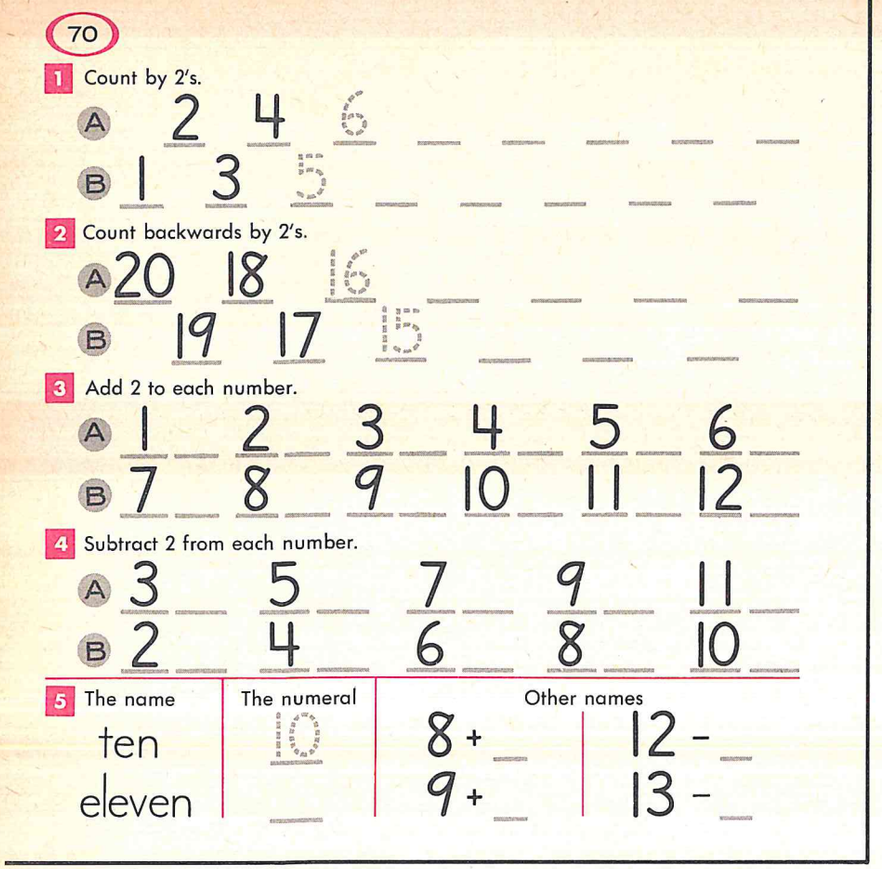
Now look at the row with the numeral 5 in the square. What does the word say? [subtract] **Go ahead and work this row.**

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **Write any 10 numerals. Then add 1 to each of them and write the answers. Make 2 columns, like this:**

42 —— 59 ——


69
1 Count by 1's.
A 1 2 4 6
B 10 9
2 Count backwards by 1's.
10 9
3 Add 1 to each number.
1 2 3 4 5 6
7 8 9 10 11 12
4 Subtract 1 from each number.
10 9 8 7 6 5
5 Subtract.
2 3 4 5 6 7 8 9
-1 -2 -3 -4 -5 -6 -7 -8



Purpose

To extend an understanding of counting by 2's. To give practice in addition and subtraction.

Materials

A set of 10 counters. A hundred chart.

Developmental Activity

Have the pupils do orally the exercises below:

1. Count to 20 by 2's.
2. Start at 1 and count to 21 by 2's: 1–3–5–7–9–11–13–15 17–19–21 (If children find this difficult, have the counting repeated. Use the hundred chart as a visual aid.)
3. Start at 20 and count backwards by 2's: 20–18–16–14–12 10–8–6–4–2. It may be desirable to write these numerals on the chalkboard as they are given.
4. Start with 21 and count backwards by 2's: 21–19–17–15 13–11–9–7–5–3–1. (Repeat this several times.)

Procedure

Open your books to page 70.

What does sentence number 1 say? [Count by 2's.] **Write in the answers in row A and row B.**

What does sentence number 2 say? [Count backwards by 2's.] **Write in the answers.**

What does sentence number 3 say? [Add 2 to each number.] **Do it.**

What does sentence number 4 say? [Subtract 2 from each number.] **Do it.**

Who can read what it says after the numeral 5 in the square? [The name, the numeral, other names.] Discuss these. Have the class complete the page.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Put the numeral 12 on the chalkboard. Ask the children to write as many other names for 12 as they can. They may use both addition and subtraction names. Take time for sharing and evaluating the work. This activity can lead to some very interesting other names.

71

Purpose

To test the addition and subtraction facts in 10, 11, and 12.

Materials

A set of 12 counters for each pupil.

Procedure

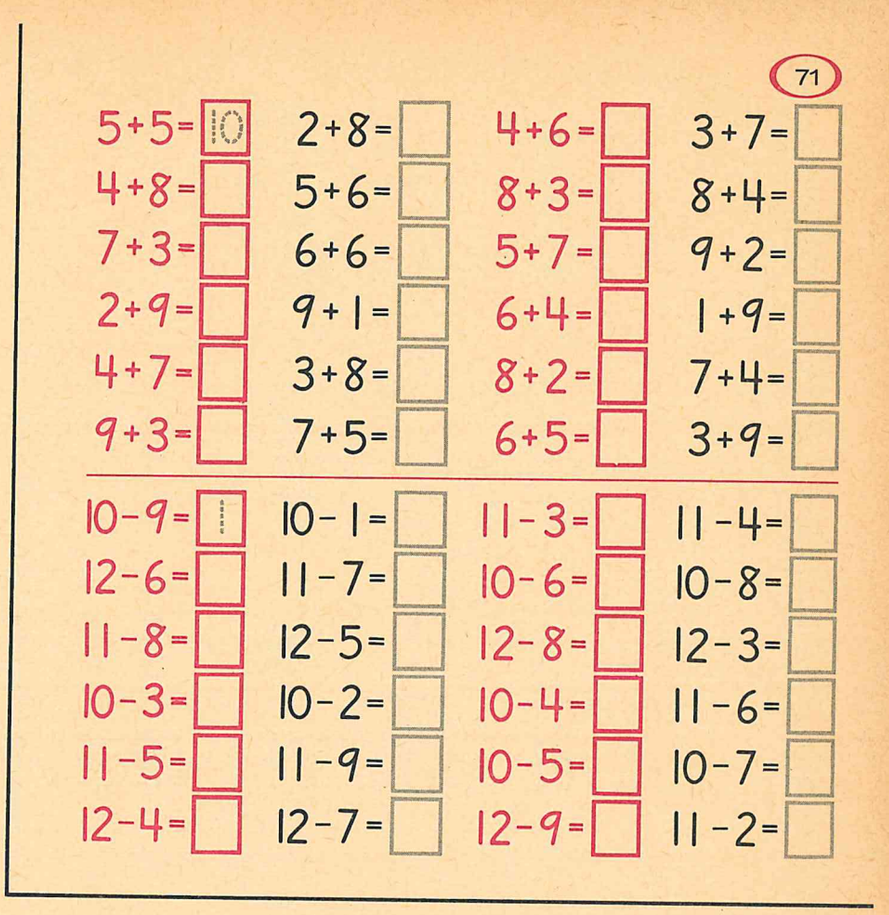
Open your books to page 71.

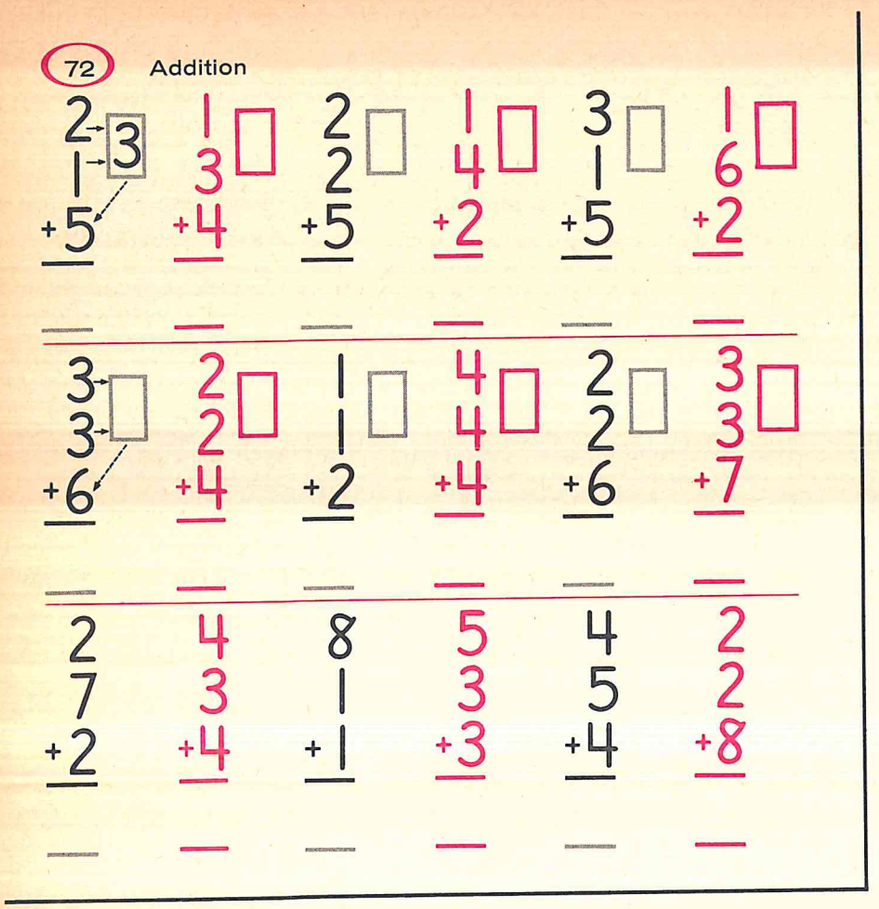
You are to write the answer to each example on this page. What is the top part of the page? [addition] **What is the bottom part of the page?** [subtraction] **Where should you write the answer to each example?** [in the frame] **Check your work with your counters.**

Extended Activity

Pass out 6″ x 9″ paper. Have the pupils take each addition number pair in the first row and change one of the numerals to make a new number name using three numerals. For example, $5 + 5 = 10$ may be changed to $5 + 2 + 3 = 10$, $5 + 1 + 4 = 10$, $5 + 3 + 2 = 10$, etc.

Take time for group sharing and evaluation of this work.





72

Purpose

To extend understanding of three-addend addition.

Materials

A set of 13 counters.

Developmental Activity

Have the children arrange 13 counters in a 3–1–9 pattern. While they are doing this, put these numerals on the chalkboard as a vertical addition example.

Look at the addition example. Now with your counters put the 3-group and 1-group together. They make a 4-group.

Look at the example on the chalkboard again. Three and 1 are 4. Draw a frame with the numeral 4 in it. Have the children combine the 4-group and 9-group of counters. **Four and 9 are ——.** Write the answer to the problem on the board.

3→ 4
1→
+ 9

Put each of these examples on the chalkboard:

2→□	7	6	4	3
3→□	1	3	2	5
+ 8	+ 5	+ 4	+ 7	+ 5

Call children to the chalkboard to add the first two numbers. Have the answers put in a frame.

Procedure

Open your books to page 72.

The examples in the top row are like those we have been working. Do them.

Now look at examples in the middle row. Do you see anything special about them? [Each one starts with a double.] **Doubles are easy, aren't they? Work the examples.**

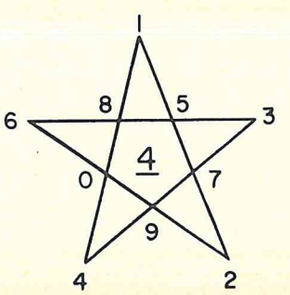
Now look at the bottom row. Can you find a double in each one? Start each one by adding the double. Then add the third number. How would we do the first one? [2 and 2 are 4. Then add the 7. 4 and 7 are 11.] **Go ahead and work them.**

Circulate and help as needed.

Extended Activity

Play "Swing on a Star."

Draw a five-pointed star on the chalkboard. Number from 0 to 9 as shown. On a line in the center write any numeral from 1 to 4.



The children "swing on the star" by adding the number in the center to the numbers around the star. The main object of the game is fun.

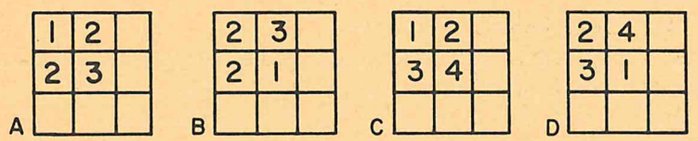
Purpose

To develop understanding of the grouping property in addition.

Developmental Activity

Draw number square A as shown on the chalkboard. Write in the numerals 1, 2, 2, and 3 as shown. Then have the pupils add across: $1 + 2 = 3$; $2 + 3 = 5$. (Use colored chalk to write the sums.) Then have them add down: $1 + 2 = 3$; $2 + 3 = 5$. Adding the answers down: $3 + 5 = 8$; across $3 + 5 = 8$.

Follow a similar procedure with number squares B, C, and D.



Next make column addition examples with the set of four numbers from each number square:

1	2	1	2
2	3	2	4
2	2	3	3
+3	+1	+4	+1
___	___	___	___

Help the pupils see that they can group the four addends in any order as they add:

1 > 3	2 > 5	1 > 3	2 > 6
2 >	3 >	2 >	4 >
2 > 5	2 > 3	3 > 7	3 > 4
3	1	4	1
8 ___	8 ___	10 ___	10 ___

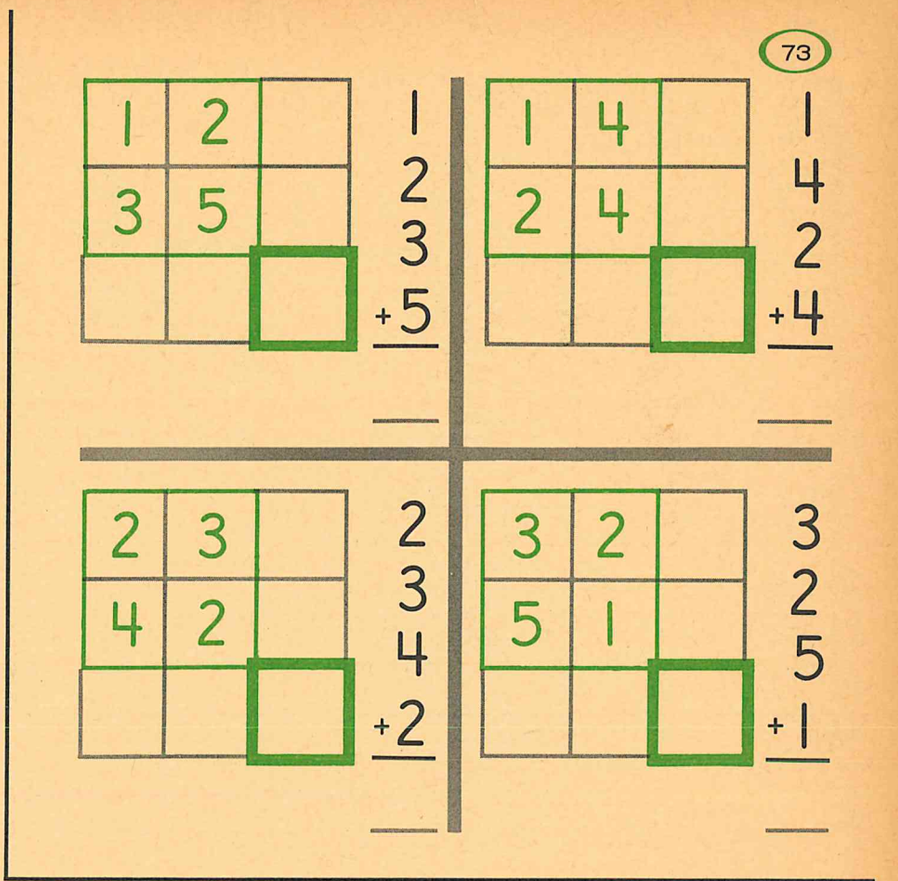
At this time, no attempt should be made to have the children formally learn the Associative Law or Property of addition. Informally, pupils should be aware of the law and should be able to use it.

Procedure

Open your books to page 73.

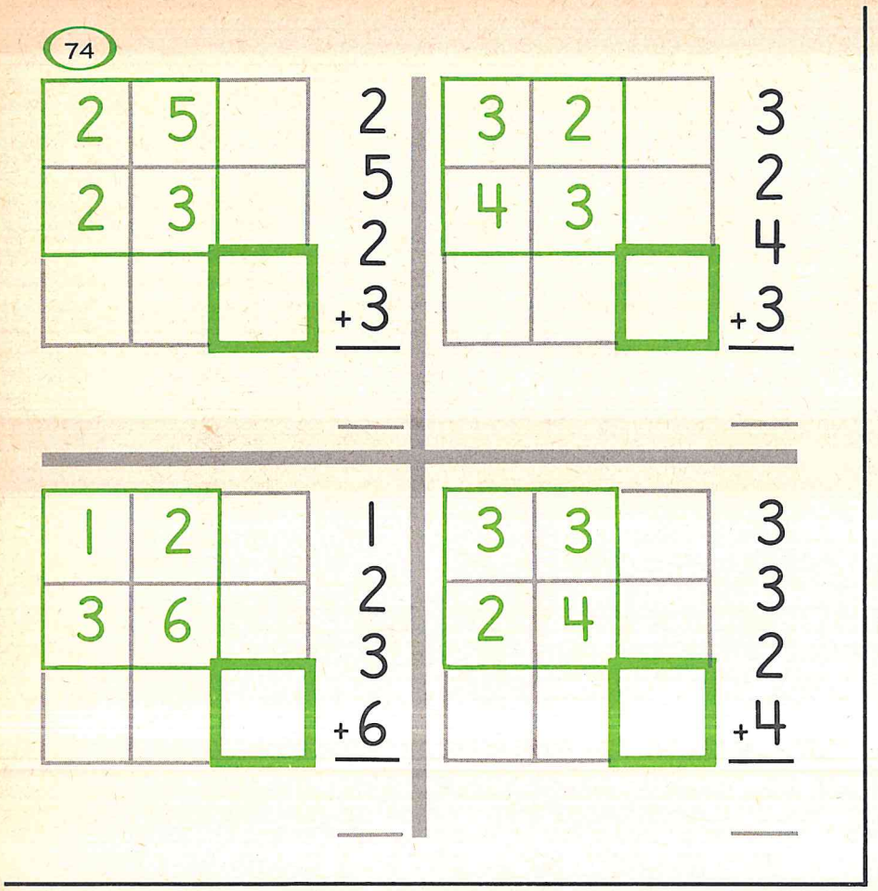
These examples are just like the ones we have been working. Go ahead and work them. Raise your hand if you have a question.

Circulate and help as needed.



Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the pupils draw four number squares. They may use the squares in their books as models. Have them put 2, 3, 4, and 3 in the squares in as many different ways as possible. **Do we get the same answer in each of our squares?** Discuss this.



Then make column addition examples with the set of four numbers from each number square:

5	2	2	3
2	3	1	4
3	3	6	2
+2	+4	+3	+3
___	___	___	___

Each of the examples has 12 as the answer.

If possible, have pupils come to the generalization that the order of adding does not affect the answer. This should be stated in their own words.

Procedure

Open your books to page 74.

These examples are just like the ones we have been doing. Go ahead and work them. Raise your hand if you have a question.

Circulate and give help as needed.

Extended Activity

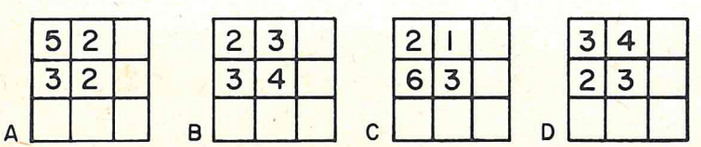
Distribute 6″ x 9″ ruled newsprint. Have the pupils make up number squares of their own.

Purpose

To extend understanding of the structure of the 12-group. To extend familiarity with the Associative Law for addition.

Developmental Activity

Draw number square A on the chalkboard. Write in the numerals 5, 2, 3, and 2 as shown. Then have the pupils add across: $5 + 2 = 7$; $3 + 2 = 5$. (If colored chalk is available, use it to write the sums in the number square.) Then have them add down: $5 + 3 = 8$; $2 + 2 = 4$. Adding the answers gives $7 + 5 = 12$ and $8 + 4 = 12$. Use this procedure for squares B, C, and D, also.



Purpose

To learn to read Roman numerals from I to XII.

Vocabulary

Roman numerals.

Materials

Materials for a scrapbook.

Procedure

Miss Gray's second grade class has finished making a science scrapbook. The last thing they did was to make the "Contents" page.

Let's open our books to page 75 to see a picture of this page.

The numerals down the side of the page tell you where each part of the book begins. What is the first part of the book about? [animals] **It begins on page 1.**

We can all read the numerals on the right-hand side of the page. Being able to read these numerals should help us read the numerals on the left-hand side of the scrapbook page.

Does anyone know what kind of numerals these are? [Roman] **Some people of long ago called Romans made their numerals like these. We sometimes use Roman numerals today. Have any of you ever seen them? Where?** [on clocks, buildings, books]

Now look at your books again. What page is about plants? Look at the Roman numeral for 2. How did the Romans make this numeral?

What is the next title? [weather] **It is on page 3. Notice the Roman numeral III.**

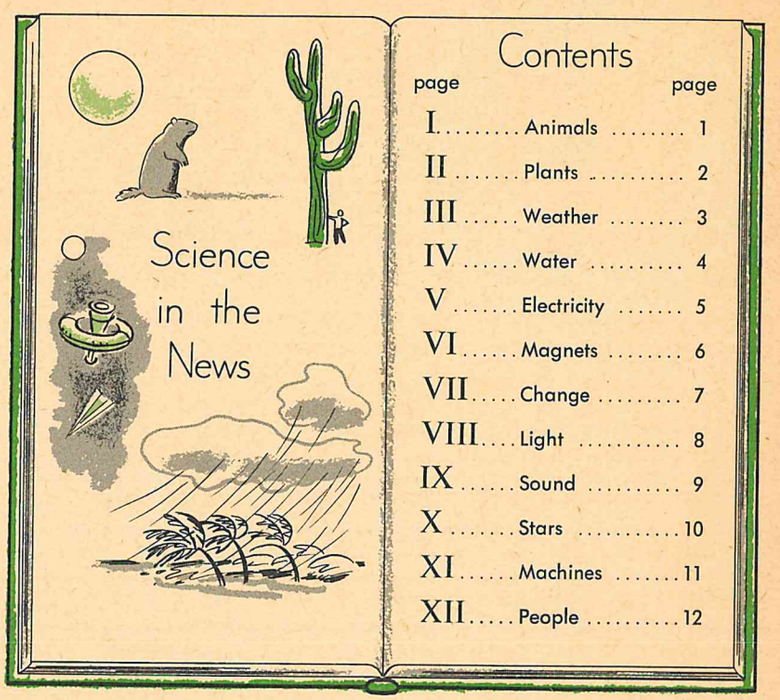
Write a Roman numeral I on the board. **Can anyone write the Roman numeral for 2? the Roman numeral for 3?**

What is page 4 about? [water] **page 5?** [electricity] **What letter did the Romans use for 5? Four is how much less than 5? To show that 4 is 1 less than 5, the Romans wrote a V (5) and then put a one to the left of it, like this: IV.** (Write IV on the chalkboard.) **The number became 5 take away 1 or 4.**

What is on page 6? [magnets] **page 7?** [change] **page 8?** [light] Have the children try to discover why these Roman numerals are written as they are.

What is page 9 about? [sound] **page 10?** [stars] Have the children look carefully at the Roman numeral for 10; then at the Roman numeral for 9. **Why do you think 9 is written this way?**

Continue with 11 and 12. Have the children suggest reasons why 11 and 12 are written XI and XII.

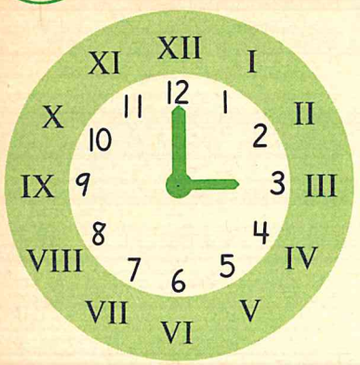


Then have the children place a ruler or strip of paper over the Hindu-Arabic numerals. Let several children read the title of each page and the page number by looking at the Roman numerals only.

Extended Activity

Plan the making of a large book in some content area, such as health, science, or social studies. Use Roman numerals in the Table of Contents.

76 Fun with Roman Numerals



How Roman numerals are made.

1	2	3	4	5
6	7	8	9	10

Write the Roman numerals.

1	8	15
2	9	16
3	10	17
4	11	18
5	12	19
6	13	20
7	14	

Write the numerals.

I	III
XIX	V
II	VII
IV	X
VI	XII
IX	VIII
XI	XIV
XIII	XV
XVI	XVII
XVIII	XX

76

Purpose

To review Roman numerals from I through XII. To learn to read and write Roman numerals from XIII through XX.

Vocabulary

Roman numerals.

Materials

For each child a cardboard circle that is the size of the inner clockface in the pupil's page. Squared newsprint.

Procedure

Open your books to page 76.

Since the children can read a clockface which has Hindu-Arabic numerals on it, they should have little difficulty reading one which uses Roman numerals. If possible, find a clock that has Roman numerals on it and show it to the children. If such a clock is not available, draw one on the chalkboard.

Review Roman numerals through 12. Then give each child a cardboard circle to cover the Hindu-Arabic numerals on the clockface in the book.

Draw a large clock with Roman numerals on the chalkboard. Show the minute hand at 12. Use a pencil, ruler, etc., as the hour hand and point to various hours.

In their books, have the children draw a ring around the Roman numeral to which you have pointed the hour hand on the chalkboard clock. Have a child read the hour. Continue this for all the numerals on the clockface.

Now look at the box in the upper right-hand corner. Can you write the Roman numeral for each of these numerals? Use questions to help children help themselves.

Look at the box in the lower left-hand corner. Read the sentence at the top. [Write the Roman numerals.] **You know how to write the Roman numerals to 12.** Give the children time to write each numeral in its proper place.

How do you write 12 as a Roman numeral? [XII] **How many is X** (Write X on the board)? [10] **How many is II** (Write II on the chalkboard)? **The Roman numeral for 12 means 10 and 2. Do you think you can write the Roman numeral for 13? What is it?** Develop the numerals through 20 in a similar fashion.

Write the Hindu-Arabic numerals through 20 on the chalkboard. Call on various children to write the Roman equivalent next to each numeral.

Then have the children write each Hindu-Arabic numeral beside its Roman counterpart to finish the page. Ask whether the Roman numerals are in the usual counting order or if they have been mixed up. You might suggest to those who have difficulty that they skip around and do the easiest ones first.

Extended Activity

Give the children squared newsprint. Ask them to make a page of Roman numerals to take home to their parents. Be sure to check the papers for correctness before they are sent home.

Review reading and writing Roman numerals from time to time. You might teach a fast group to read and write them to 40 or 50.

77

Purpose

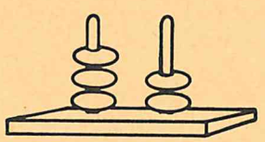
To extend understanding of place value by using the abacus.

Materials

A chalkboard abacus, a 100 number line.

Developmental Activity

How well do you remember how to read the abacus? Hold an abacus up or put a simplified abacus picture on the chalkboard.



What number have I shown on this abacus? [32] **Let's read it the long way; that is, as tens and ones.** [3 tens and 2 ones]

Show the following on an abacus or draw them on the chalkboard abacus: 14, 36, 24, 47. Have the group quickly read each abacus setting: (1) the regular way (fourteen), (2) the long or expanded way (1 ten and 4 ones).

Now let's compare some numbers. Put 23 and 32 next to each other on the chalkboard. **Which is more?** [32] **Why?** Use the abacus to explain. **Thirty-two is 3 tens and 2 ones; 23 is 2 tens and 3 ones; 3 tens is more than 2 tens. What sign did we learn that shows more than?** [>] Write 32 > 23 on the chalkboard. **Thirty-two is more than 23. Let's turn that around:** 23 < 32. **Who can read it now?** [23 is less than 32.]

Put the following on the chalkboard:

23	45	36	29
16	19	17	14
24	21	26	36

Have individual pupils put in the appropriate sign > or <. Discuss each one. Find each number as a point on the number line.

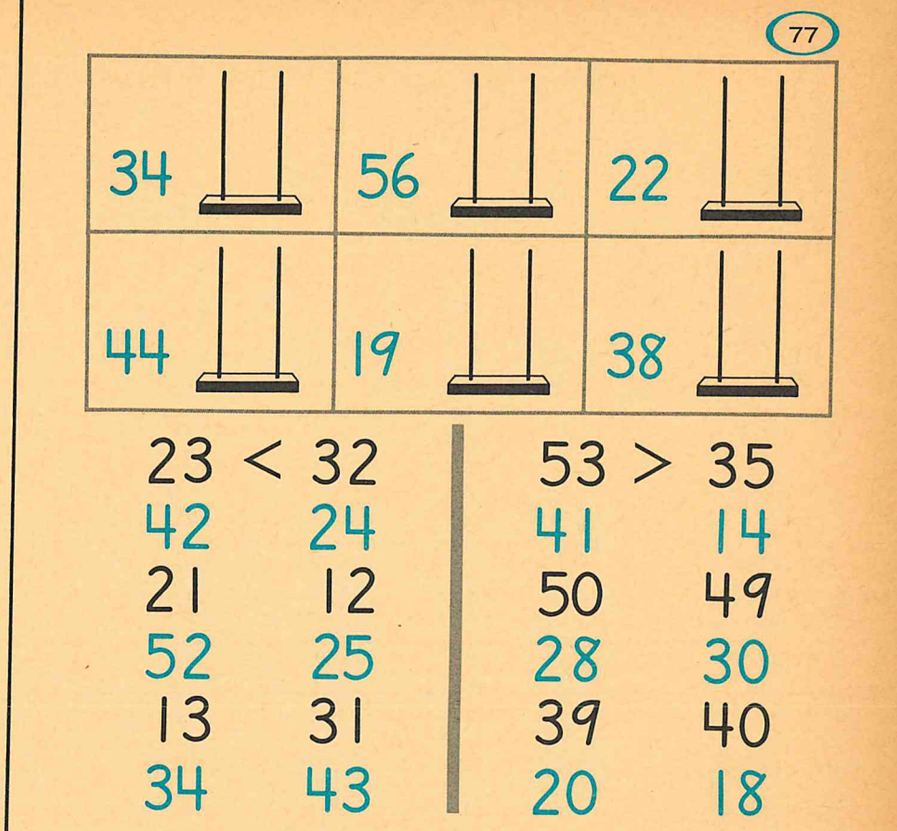
Procedure

Find page 77 in your books.

At the top of the page show each number on the abacus next to it. Use crayons.

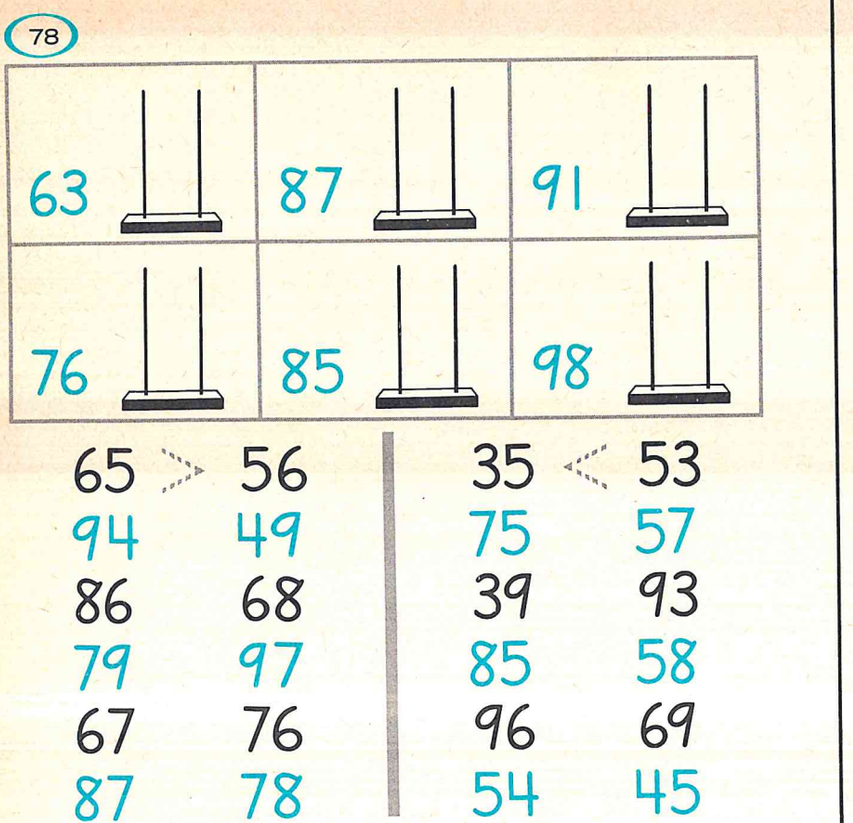
On the bottom part of the page put in the sign for more than or less than. For each one be ready to tell why you used the sign you did. Work carefully.

Circulate and help as needed.



Extended Activity

Have pupils go to the chalkboard and draw abacus pictures to show why the answer they used in the "more than"–"less than" material on the lower part of the page was correct. Find each pair on the chalkboard number line.



78

Purpose

To extend understanding of place value.

Materials

Abacus, a 100 number line.

Developmental Activity

Today we are going to study more numbers by showing them on the abacus. Let's start by reading some numbers the regular way and the long way. Draw an abacus picture for each of these numbers on the chalkboard: 64, 89, 72, 53, 95. If the group needs more practice, make up some additional examples.

Now let's see how well we can do with these "more than" or "less than" examples. On the chalkboard write the following:

67	76	94	49
86	68	54	45

As pupils put in the > or < symbol, have them tell why they chose it. Have them find each number as a point on the number line.

If more practice is needed, supply additional examples.

Procedure

Find page 78 in your books.

At the top of the page show each number on the abacus. Use crayons to do this.

On the bottom part of the page put in the sign for more than or less than. Be ready to tell why you chose the sign you did. Work neatly.

Circulate and help as needed.

Extended Activity

Have pupils go to the chalkboard and draw abacus pictures to show why the answer they used in the "more than"—"less than" material on this page was correct.

79

Purpose

To extend children's knowledge of the names of the months, to group months by seasons, to teach names of the seasons. To help children recognize that 12 months make 1 year. To teach children how to chart or tabulate data.

Vocabulary

Fall (autumn), winter, spring, summer, season, year, January, February, March, April, May, June, July, August, September, October, November, December.

Materials

Butcher paper, felt-tipped pen.

Developmental Activity

Can anyone tell me the name of one of the months of the year? another month? List the months on the chalkboard as children name them. (Do not erase this list.) **Does anyone know how many months there are in a year? Have we listed them all?**

The year is divided into four seasons. Can anyone name them? Who can give a sentence about winter? about spring, etc.? Write the sentences on the chalkboard as children dictate them.

Procedure

Open your books to page 79, then to page 80. These 2 pages go together.

Discuss page 79. **What are the 2 words in the middle of the page at the top?** [fall, autumn] **Can you find and read the names of the other seasons? You will have to turn to page 80 for some names.**

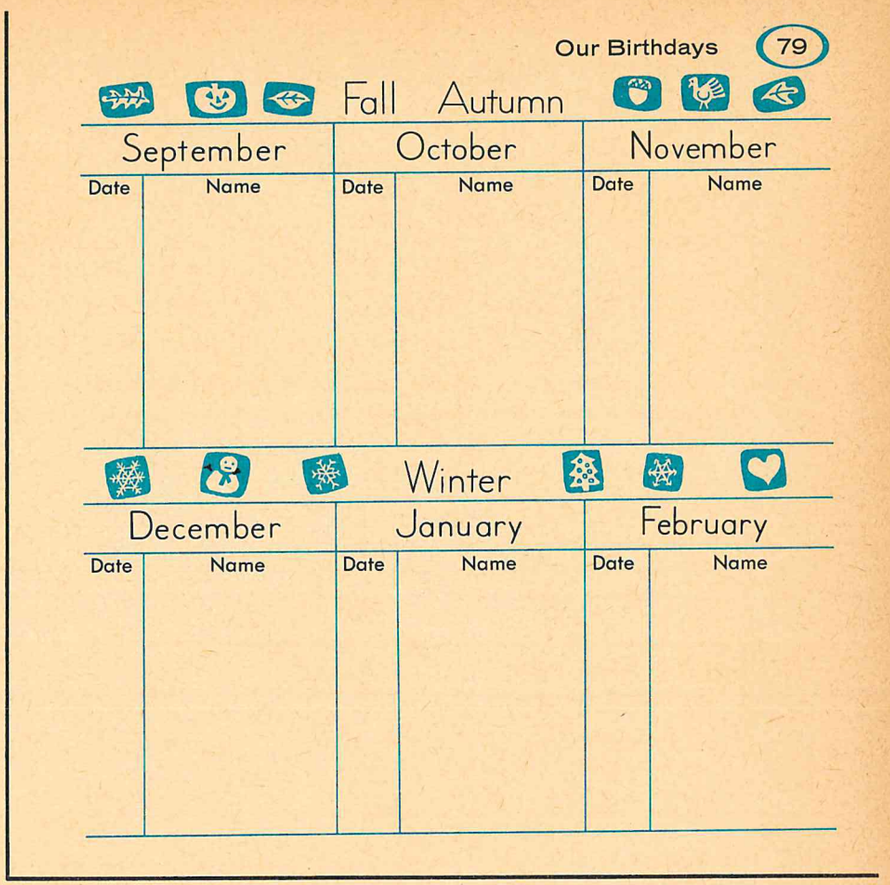
Are all the months of the year shown on these pages? How many are there? Is September the first month? Does anyone know which month of the year comes first?

Have a child read the name of the first season shown and the months included. Have another child draw an orange ring around each fall month on the chalkboard list of months. Use a similar procedure for the remaining seasons.

Ask how many children have birthdays in September. List their names on the chalkboard together with the numeral for the day. Include last initials where necessary.

In their books have the children carefully copy the names of those having birthdays in September. Then have a child read the names, while another child makes a tally for each name.

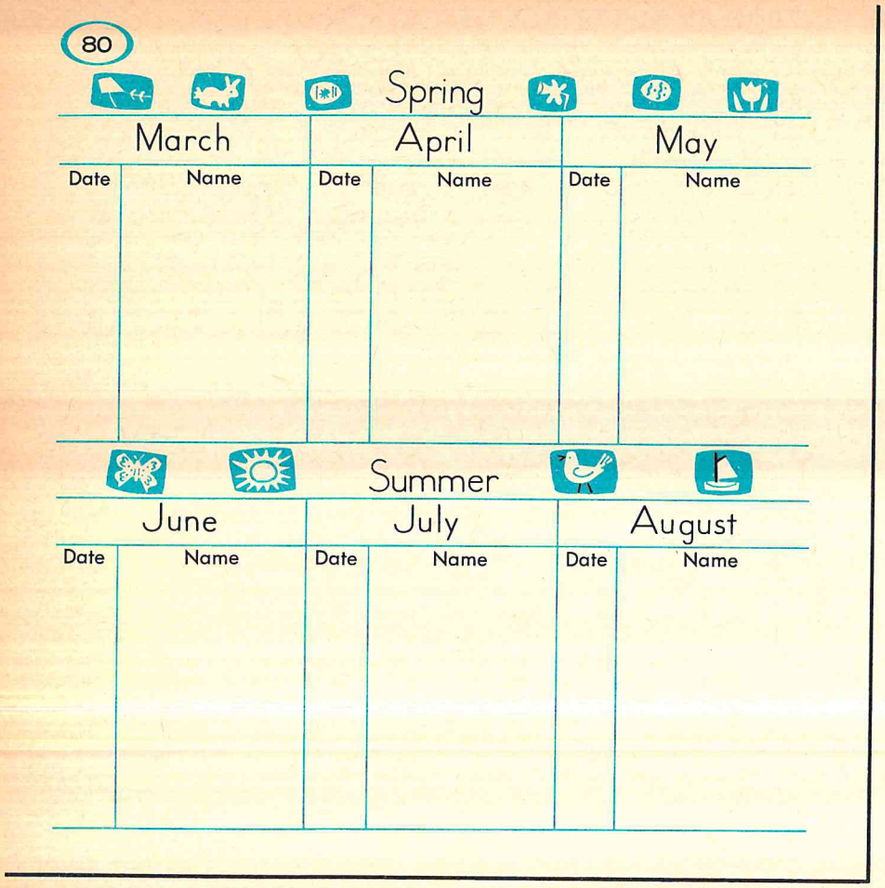
Complete the page by working in a similar manner.



Extended Activity

You may develop a large class chart similar to pages 79 and 80. The children will enjoy decorating the border, filling in birthdays, and tallying at the end of the month. Special recognition may be given at the end of each month for those whose birthdays fall in that month.

Poetry books for children are sources of many delightful poems about the seasons. Find several such poems and share them with the children.



Purpose

To extend children's knowledge of the names of the months, to group months by seasons, to teach names of the seasons. To help children recognize that 12 months make 1 year. To teach children how to chart or tabulate data.

Vocabulary

Spring, summer, March, April, May, June, July, August.

Procedure

Follow the same procedure as on page 79.

Use this page to continue the chart begun on page 79.

81

Purpose

To extend the understanding of the numeral 13 and the word thirteen. To explore some of the ideas these symbols represent.

Materials

A set of 13 counters for each pupil, a chalkboard number line.

Developmental Activity

Put the numeral 13 on the chalkboard. **Who can read this numeral? What is another way to read it?** [1 ten and 3 ones]

Today we are going to learn some more about the idea of thirteen. First, put 13 counters on your desk in front of you. Have the children make number sentences for 13 by dividing their counters into two groups. Each group should have no more than 9 counters in it. This eliminates the use of 10, 11, and 12.

Have pupils take turns writing number pairs on the chalkboard. Work until all the pairs for 13 have been written:

$9 + 4 = 13$	$8 + 5 = 13$	$7 + 6 = 13$
$4 + 9 = 13$	$5 + 8 = 13$	$6 + 7 = 13$

Are there other names for 13 we could write? Explore some:

$10 + 3 = 13$	$3 + 10 = 13$
$4 + 4 + 5 = 13$	$5 + 5 + 1 + 1 + 1 = 13$
$11 + 2 = 13$	$1 + 4 + 8 = 13$

When the pupils have demonstrated a good grasp of this, go on to Procedure.

Procedure

Open your books to page 81.

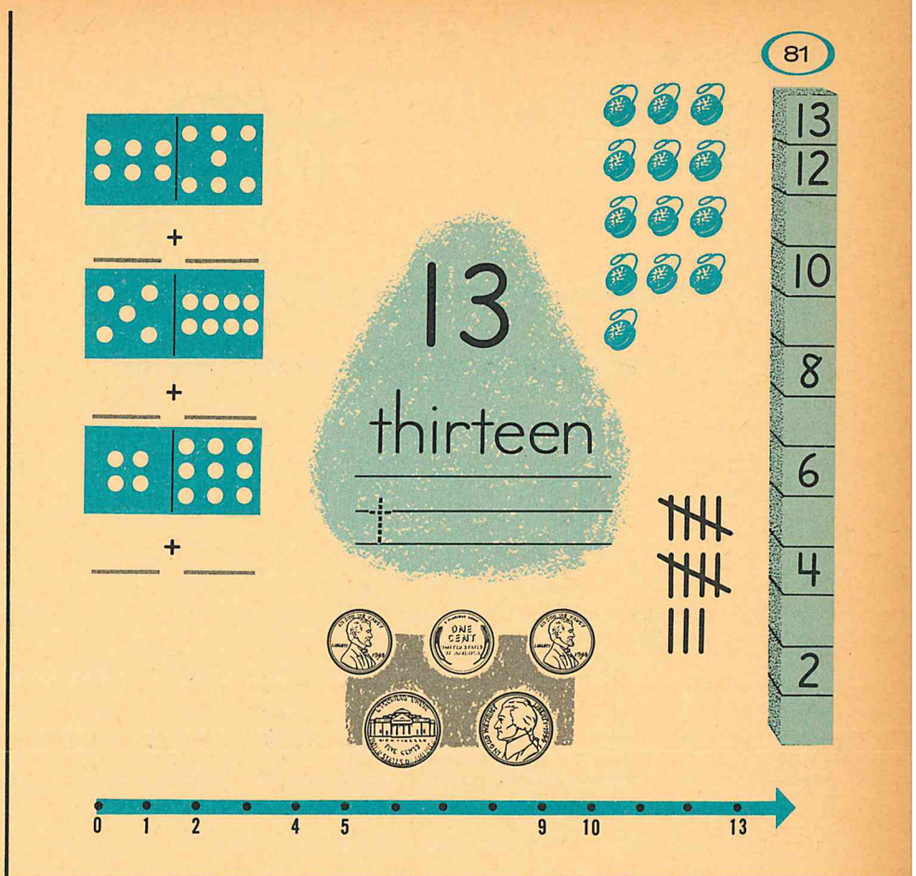
Draw a ring around the numeral 13 in the middle of the page. Draw a line under the number word "thirteen" in the middle of the page. Write the word "thirteen" on the lines.

Find the column of dominoes. What number name for 13 does the first domino suggest? [6 + 7] **Write it on the lines under the domino. Six and 7 is another name for ___.** [13] **What is the name for 13 given by the second domino? Write the numerals on the line.** Repeat for the third domino.

Find the money. What number sentence does the money suggest? [5 + 5 + 3 = 13 or variations of this]

Find the tallies. What number sentence do they suggest? [5 + 5 + 3 = 13]

Look at the number line. Write in the missing numerals.

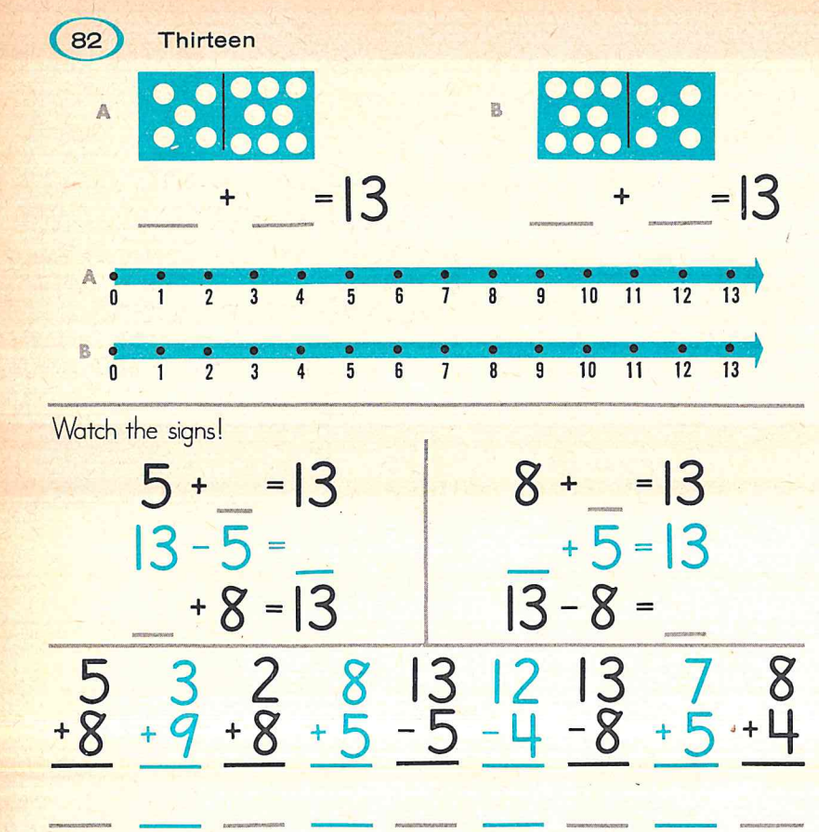


Look at the tower of blocks. How many blocks are there? [13] **Write in the missing numerals.**

Find the yo-yos. What number sentence do they suggest? Explore.

Extended Activity

Can you find 6 addition facts for 13 with your counters? What is the largest number we should use for these facts? [9] Have the children write them on a page of 6″ x 9″ ruled newsprint.



As each subtraction fact is developed, it is important to draw from the children the related addition facts—for example, for $13 - 5 = 8$, the addition facts $5 + 8 = 13$ and $8 + 5 = 13$.

When $13 - 5 = 8$ is developed, ask the children if they can tell the whole story about 13, 5, and 8. **What other number sentences can we write?** List these on the chalkboard.

A number line should be used to show these relationships. See page 54.

Procedure

Open your books to page 82.

What is the number word at the top of the page? [thirteen]

Look at the dominoes. How should we write the number sentence under the A domino so that it tells the domino story? [5 + 8 = 13] **What name for 13 is shown by the B domino?** [8 + 5 = 13] **Now can you show these number sentences on number lines A and B?**

Then write the missing numerals in the sentences on the bottom part of the page. Work the other addition and subtraction examples. Watch the signs!

Extended Activity

Have each pupil make a set of 3″ x 5″ flash cards for the twelve addition and subtraction facts in 13.

82

Purpose

To develop an understanding of the addition and subtraction relationships in 5, 8, and 13.

Materials

A set of 13 counters for each pupil, a chalkboard number line.

Developmental Activity

Take out 13 counters and place them in a row on your desk. How many other names for 13 can we make with two groups of the counters? Let's write the number sentence for each pair on the chalkboard. Have individual pupils take turns writing the sentences. Six pairs should be discovered.

Next use the 13 counters to develop the six subtraction facts in the group. Have each pupil arrange his counters in a single row. Have him take away 4 counters, then 5 counters, 6 etc., (through 9 counters) to show $13 - 4 = 9$, $13 - 5 = 8$, etc.

83

Purpose

To extend understanding of the addition and subtraction relationships in 6, 7, and 13.

Materials

A set of 13 counters for each pupil, a chalkboard number line.

Developmental Activity

Place 13 counters in a straight row. Separate them into a group of 6 and a group of 7. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$6 + 7 = 13$	$13 - 7 = 6$	$7 + \_\_ = 13$	$\_\_ + 7 = 13$
$7 + 6 = 13$	$13 - 6 = 7$	$6 + \_\_ = 13$	$\_\_ + 6 = 13$

Have pupils take turns showing each of these number sentences on the number line.

Procedure

Open your books to page 83.

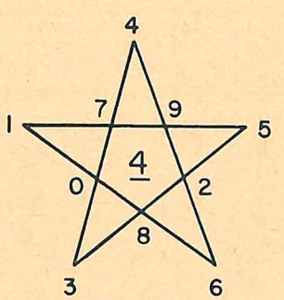
What is the number word at the top of the page? [thirteen]

What is the number sentence for domino A? [6 + 7 = 13] **Write the number sentence under each domino. Then show them on number lines A and B.**

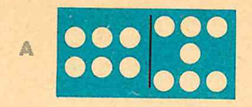
Write the missing numerals in the number sentences at the bottom of the page. Then work the addition and subtraction examples. Watch the signs! Use counters to help if you wish.

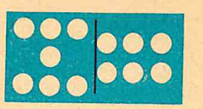
Extended Activity

Play "Swing on a Star." Draw a five-pointed star on the chalkboard. Number from 0 to 9 as shown. On a line in the center write any numeral from 1 to 4.



The children "swing on the star" by adding the number in the center to the numbers around the star. The main object of the game is fun.





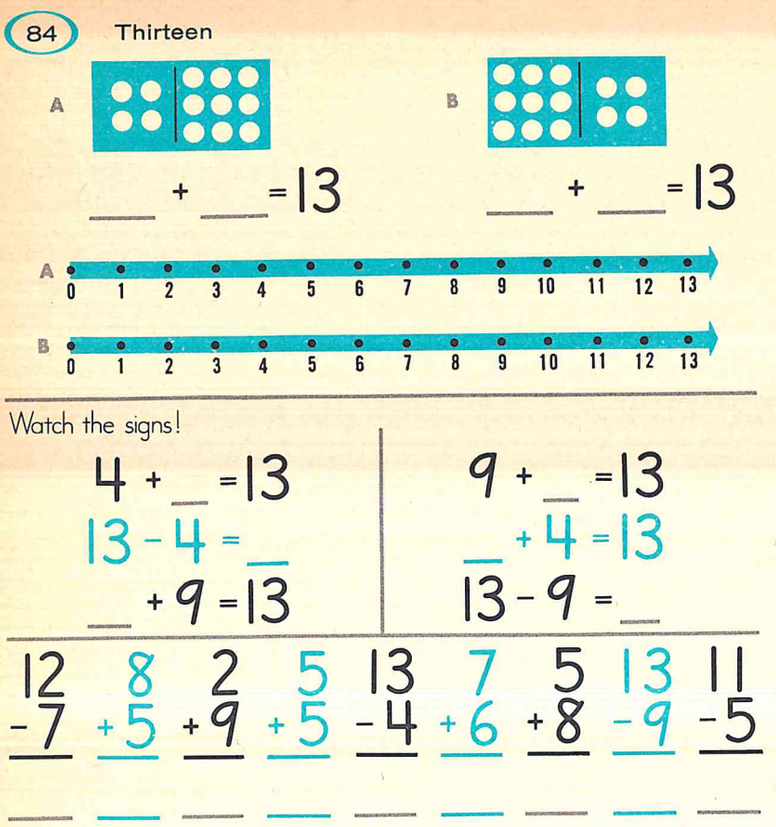
$\_\_ + \_\_ = 13$ $\_\_ + \_\_ = 13$

Watch the signs!

$6 + \_\_ = 13$
$13 - 6 = \_\_$
$\_\_ + 7 = 13$

$7 + \_\_ = 13$
$\_\_ + 6 = 13$
$13 - 7 = \_\_$

7	4	8	6	13	9	13	12	7
+5	+6	+3	+7	−7	+3	−6	−8	+6
__	__	__	__	__	__	__	__	__



84

Purpose

To extend understanding of addition and subtraction relationships in 4, 9, and 13.

Materials

A set of 13 counters for each pupil, a chalkboard number line.

Developmental Activity

Place 13 counters in a straight row. Separate them into a set of 4 and a set of 9. How many number sentences can we write about these groups? Develop all the possible statements through discussion. Have pupils put the sentences on the chalkboard:

$4+9=13$	$13-4=9$	$\_+4=13$	$4+\_=13$
$9+4=13$	$13-9=4$	$\_+9=13$	$9+\_=13$

Have pupils show each of these sentences on the number line.

Procedure

Open your books to page 84.

What is the number word at the top of the page? [thirteen]

Write the missing numerals under each domino.

You have worked many pages like this. Go ahead and finish the page. Raise your hand if you need help. Use counters if you wish.

Extended Activity

Put the number pair 4, 9 on the chalkboard. Using them, have the pupils make up as many number sentences as they can. Sentences may be written on 6″ x 9″ ruled newsprint.

4, 9

$4+9=\_$	$4+\_=13$
$9+4=\_$	$9+\_=13$
$\_+9=13$	$13-9=\_$
$\_+4=13$	$13-4=\_$

Have the pupils write the open sentences with pencil, putting the solutions in with crayon. Using this method helps children understand the special relationships in 4, 9, and 13. This work should be evaluated with the group.

85

Purpose

To extend concepts for 10, 11, 12, and 13 by using three addends.

Materials

A set of 13 counters for each pupil.

Developmental Activity

Take out a set of 13 counters. Remember the game in which we made up number names using three numerals? For example, with 10 we might have written 3 + 3 + 4.

Place your counters so that they show a 3—3—4 pattern. Today we are going to see how many names for 13 we can make by using three groups. As number names are suggested, do two things:

(1) Have the pupils show the name with their counters.

(2) Have a pupil write the number sentence on the chalkboard. As many solutions as possible should be organized on the chalkboard. Some are:

1 + 3 + 9 = 13	1 + 5 + 7 = 13
1 + 4 + 8 = 13	1 + 6 + 6 = 13

Encourage pupils to suggest solutions that are related—that is, solutions that are variations of previous sentences.

Zero will not appear as an addend if pupils show the names wiht their counters. If it is given as part of a solution, accept it and go on. You might suggest that zero will not be used today.

Procedure

Open your books to page 85.

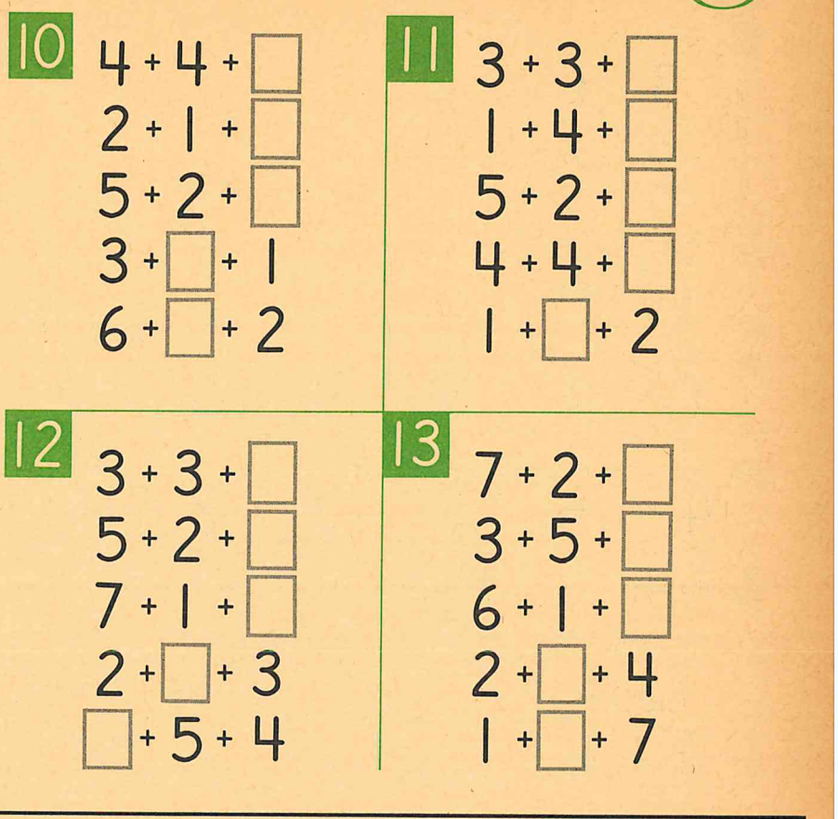
In each of the boxes you will see a set of examples which are not finished. Finish each one so that it is another name for the number at the top of the box. Put each answer in the empty frame. Demonstrate this on the chalkboard. **An empty frame tells us that a numeral is missing. Work neatly.**

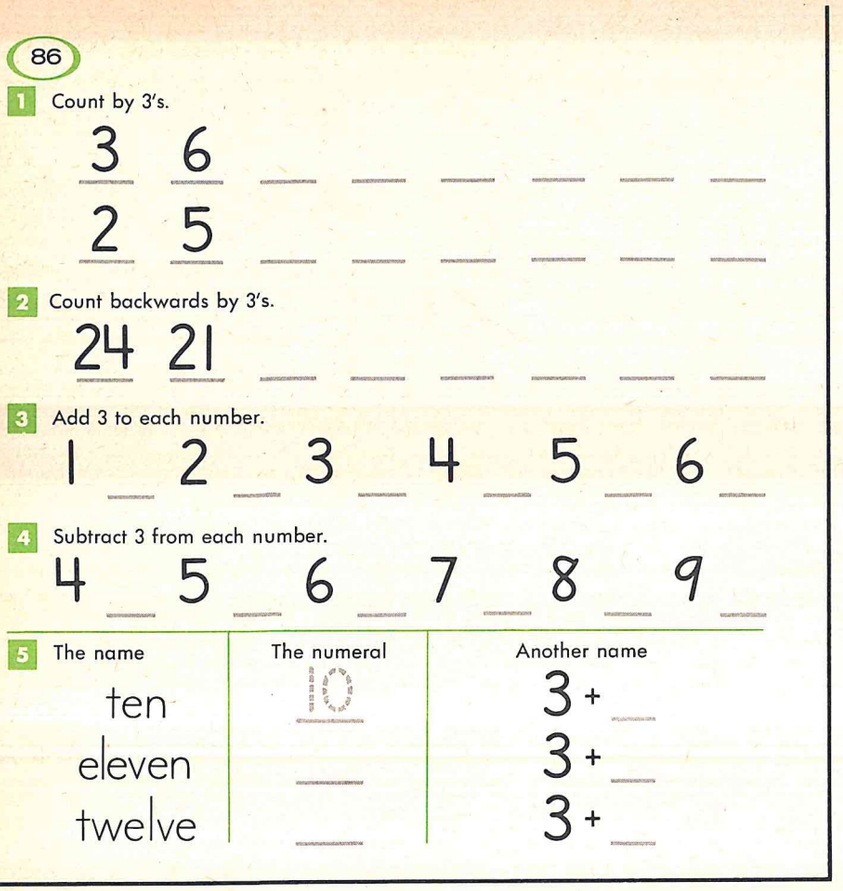
Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint.

Write the numeral 13 at the top of your page. Write as many names for 13 as you can. Use either two or three numerals with addition. For example, you might use 7 + 6 = 13 or 4 + 4 + 5 = 13.




86
1 Count by 3's.
3 6 _ _ _ _ _ _
2 5 _ _ _ _ _ _
2 Count backwards by 3's.
24 21 _ _ _ _ _ _
3 Add 3 to each number.
1 _ 2 _ 3 _ 4 _ 5 _ 6 _
4 Subtract 3 from each number.
4 _ 5 _ 6 _ 7 _ 8 _ 9 _
5
The name
The numeral
Another name
ten
10
3 + _
eleven
_
3 + _
twelve
_
3 + _

Purpose

To extend understanding of counting by 3's. To give practice in addition and subtraction.

Materials

A chalkboard number line, a hundred chart.

Developmental Activity

Have the pupils work each of these exercises first orally, then on the chalkboard number line:

1. Count to 24 by 3's: 3–6–9–12–15–18–21–24. (Have the children do this several times.)
2. Start with 2 and count by 3's to 23: 2–5–8–11–14–17–20–23. (Repeat this a few times.)
3. Start with 1 and count by 3's to 22: 1–4–7–10–13–16–19–22.
4. Start with 24 and count backwards by 3's: 24–21–18–15–12–9–6–3. Write these numerals on the board as they are said. Have the counting done several times.

Procedure

Open your books to page 86.

What does sentence number 1 say [Count by 3's.] **Write in the answers.** Circulate and give help as needed.

What does sentence number 2 say? [Count backwards by 3's.] **What numeral should we write after 21?** [18] **Now write in the other numerals.**

What does sentence number 3 say? [Add 3 to each number.] **Do it.**

Read sentence 4. What does it tell you to do? [Subtract 3 from each number.] **Subtract or take away 3 from 4. What is your answer?** [1] **Where should you write the 1?** [on the line next to 4]

Find line 5. Can we write the numeral for each number word? Then write another name for each.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Write the numeral 13 on the chalkboard. Ask the group to write as many other names for 13 on their papers as they can. Let them use any set of numbers they wish. Encourage originality.

Take time for sharing and evaluation.

87

Purpose

To test the addition and subtraction facts in 11, 12, and 13.

Materials

A set of 13 counters for each pupil.

Procedure

Open your books to page 87.

Write the answer to each example in the frame. What is the top part of the page? [addition] **What is the bottom part?** [subtraction]

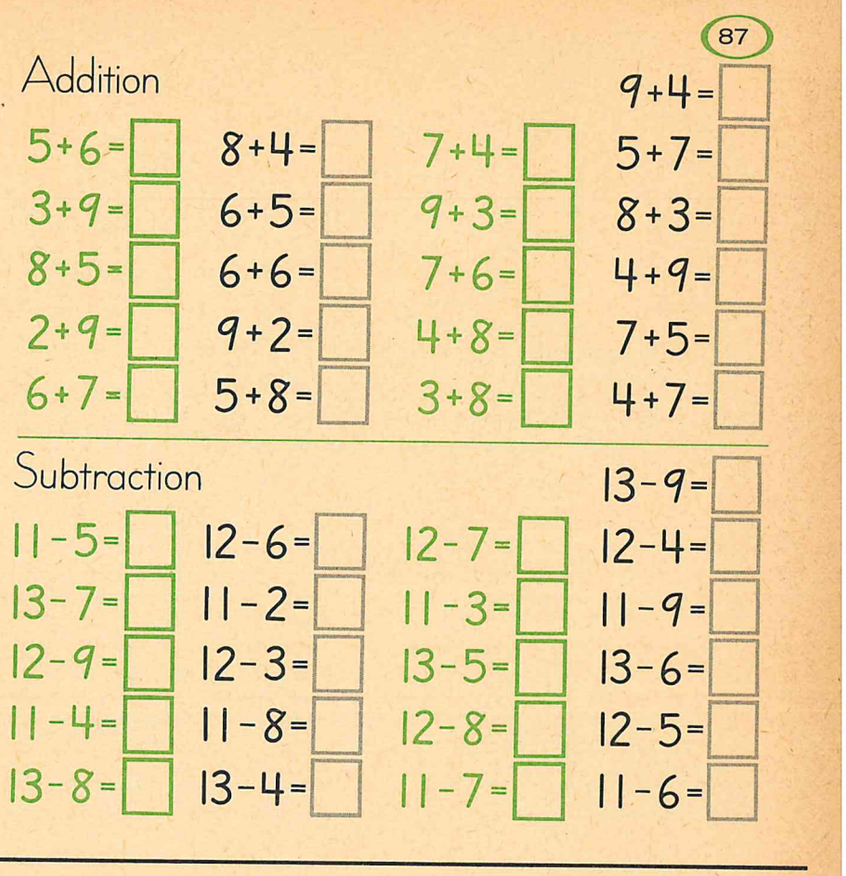
When you have finished the page, check your work with your counters.

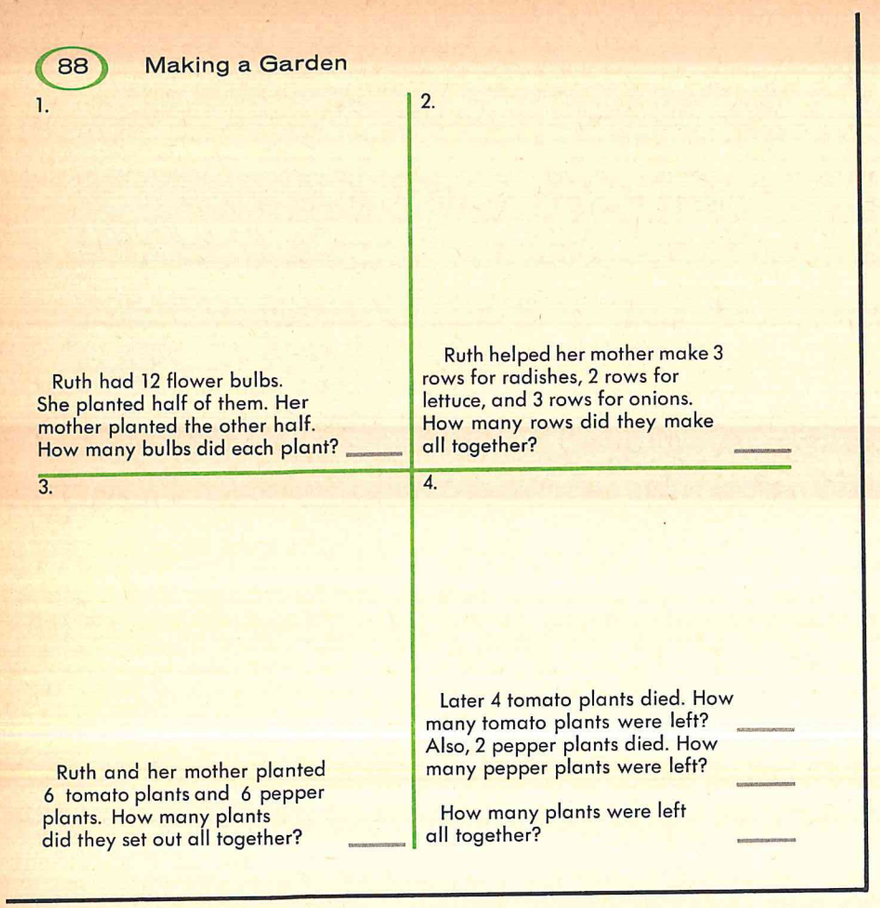
Extended Activity

Pass out 6″ x 9″ paper. Have the pupils take each addition number pair in the first row and change one of the numbers to make a new number name using three numbers. For example, $5 + 6 = 11$ may be changed to

$5 + 3 + 3 = 11$ or
$5 + 1 + 5 = 11$ or
$5 + 2 + 4 = 11$ etc.

Take time for group evaluation of this work.




88
Making a Garden
1.
Ruth had 12 flower bulbs. She planted half of them. Her mother planted the other half. How many bulbs did each plant?
2.
Ruth helped her mother make 3 rows for radishes, 2 rows for lettuce, and 3 rows for onions. How many rows did they make all together?
3.
Ruth and her mother planted 6 tomato plants and 6 pepper plants. How many plants did they set out all together?
4.
Later 4 tomato plants died. How many tomato plants were left?
Also, 2 pepper plants died. How many pepper plants were left?
How many plants were left all together?

88

Purpose

To read and solve story problems.

Vocabulary

How many, each, all together.

Materials

Packets of bulbs, flower and vegetable seeds or pictures of them.

Developmental Activity

Work this lesson as a small-group activity. **Today I have some seed packets with me. As I hold each one up, see if you can recognize the flower or vegetable which will grow from one of the seeds?** Each packet may be placed on the chalk tray and the word identifying the contents written above it. If flower bulbs and onion bulbs are used, discuss the difference. This lesson could relate to a science experience leading to the generalization that some plants grow from seeds and some from bulbs.

Procedure

Open your books to page 88.

This page is different from any page of story problems we have had. How is it different? [There is a blank space above each problem.]

Call on a child to read the first problem. **What does it tell you?** Elicit from the children all the pertinent information given in the problem. **What does it ask you? How do you think we should find the answer?** Have the children draw the 12 bulbs and then divide them in half or into two equal groups. If the children give the answer without drawing the picture, have them draw it and divide the bulbs as a check for the answer. **Where should you write the answer?**

Ask another child to read the second problem. **What does the problem tell you?** Have the children tell you all the relevant information presented in the problem. **What does it ask you?** Have the children draw the rows of radishes, lettuce, and onions, either as an aid to solving the problem or as a check to a solution they have already reached.

Use a similar procedure for problem number 3.

Now let's look at the fourth problem. Ask a child to read the entire problem. **How is this different from the other problems on this page? Yes, you must give 3 answers. It is also different in another way.**

Let us read problem number 4 to the first answer line. What does this part of the problem tell you? What does it ask you? Let's draw the 4 tomato plants. Can you answer it now? What must you do to get the answer? Elicit from the children that they must go back to problem 3 to find how many tomato plants were planted. Then they can use this information in problem 4 to reach an answer. Have them write in the answer.

Use a similar procedure for the second part of the problem. Write the answer on the line.

Then have the children read the last part of the problem. **Does this sentence ask you something or does it tell you something? What does it ask you? How can we get the answer?** Have the children write the answer.

Extended Activity

Take this page home and share it with your parents. Explain to them how the picture can help you show that an answer is correct.

Play games at home by making up problems.

89

Purpose

To extend understanding of the grouping property in addition.

Developmental Activity

Put number square A on the chalkboard. Write in the numerals 4, 3, 5, and 1 as shown. Have the pupils add across: $4 + 3 = 7$; $5 + 1 = 6$. Use colored chalk to write in the sums. Then have them add down: $4 + 5 = 9$; $3 + 1 = 4$. Adding the answers gives 13. Use this procedure for squares B, C, and D, also.

	4	3			2	3			1	2			3	1	
	5	1			4	4			3	7			4	5	
A				B				C				D			

Make column addition examples using the set of four numbers from each number square:

$$\begin{array}{r} 4 \\ 3 \\ 5 \\ +\,1 \\ \hline \end{array} \begin{array}{l} \\ \\ \\ \\ \hline \end{array} \begin{array}{l} > 7 \\ > 6 \end{array} \qquad \begin{array}{r} 2 \\ 3 \\ 4 \\ +\,4 \\ \hline \end{array} \begin{array}{l} \\ \\ \\ \\ \hline \end{array} \begin{array}{l} > 5 \\ > 8 \end{array} \qquad \begin{array}{r} 1 \\ 2 \\ 3 \\ +\,7 \\ \hline \end{array} \begin{array}{l} \\ \\ \\ \\ \hline \end{array} \begin{array}{l} > 3 \\ > 10 \end{array} \qquad \begin{array}{r} 3 \\ 1 \\ 4 \\ +\,5 \\ \hline \end{array} \begin{array}{l} \\ \\ \\ \\ \hline \end{array} \begin{array}{l} > 4 \\ > 9 \end{array}$$

Discuss the examples. Each has an answer of 13. If possible, have pupils come to the generalization that the order of adding does not affect the answer. This should be stated in their own words.

Procedure

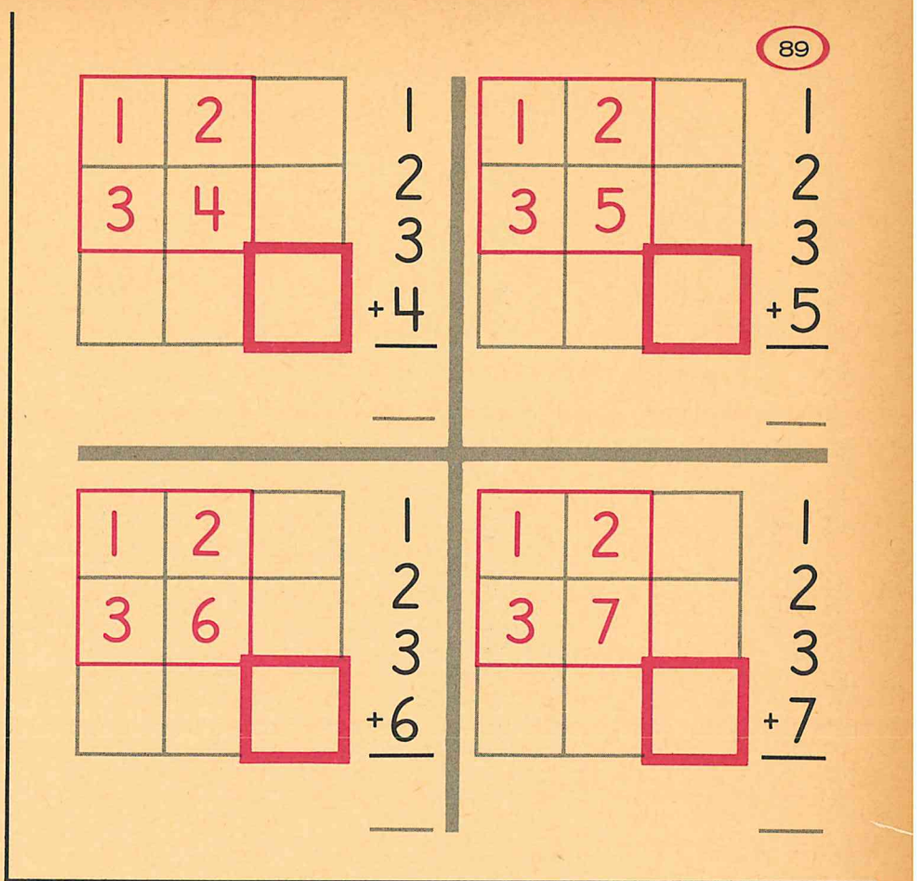
Open your books to page 89.

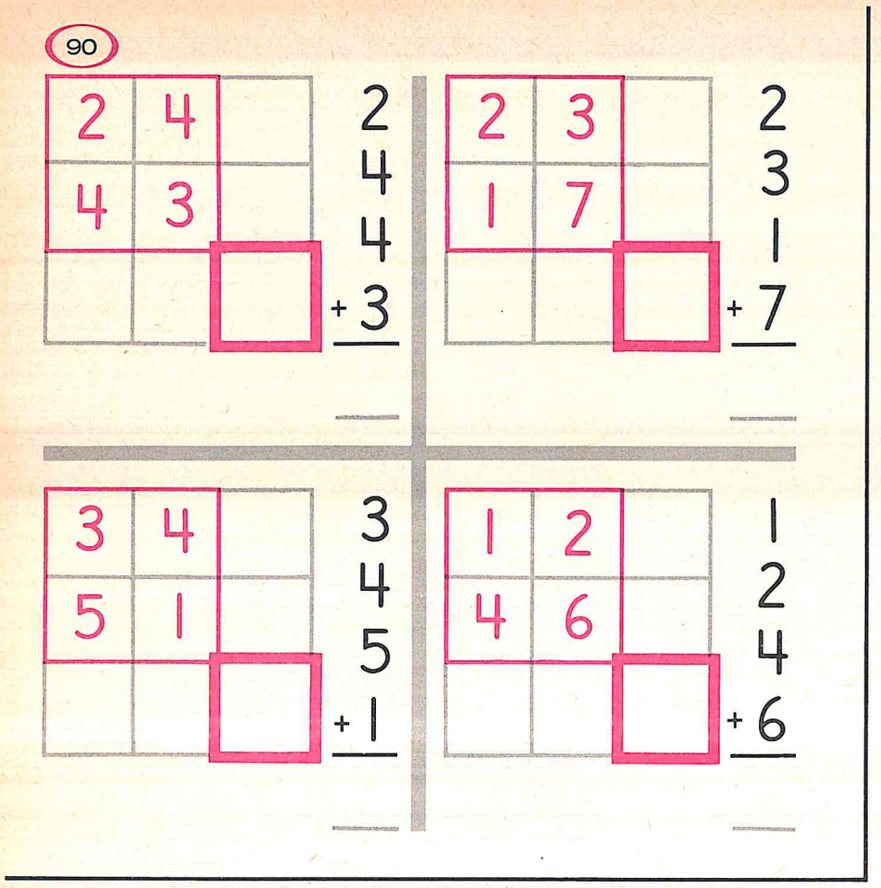
These examples are just like the ones we have been doing. Go ahead and work them. Raise your hand if you have a question.

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the pupils draw four number squares. Have them put 2, 3, 4, and 4 in each square in a different arrangement. **Do we get the same answer in each of our squares?** Discuss this.





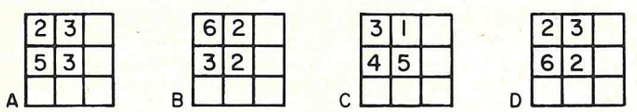
90

Purpose

To extend understanding of the structure of the 13-group. To extended familiarity with the Associative Law for addition.

Developmental Activity

Put number square A on the chalkboard. Have the pupils add across: $2 + 3 = 5$; $5 + 3 = 8$. Then have them add down: $2 + 5 = 7$; $3 + 3 = 6$. Adding the answers gives $5 + 8 = 13$ and $7 + 6 = 13$. Do this with squares B, C, and D, also.



Then make column addition examples using the set of four numbers from each number square, as on page 89.

Discuss the examples. Draw from the group that the order of adding does not affect the answer. Keep any generalization in the pupils' own words.

Procedure

Open your books to page 90.

These examples are like the ones we have been working. Go ahead and work them. Raise your hand if you have a question. Are we sitting up tall? Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the pupils draw four number squares. They may use those in their books as models. **Put 1, 2, 3, and 7 in four different arrangements in your number squares. What answer do you always get?**

91

Purpose

To extend the ability to read the thermometer. To relate thermometer readings to clothing that must be worn and to seasonal activities.

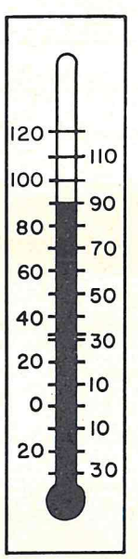
Vocabulary

Degree, above zero, below zero, above freezing, mercury, temperature, thermometer, change in weather, almost as cold as, almost as warm as, warm, warmer, warmest, hot, cold, colder, coldest, cool, cooler coolest, label.

Materials

A large outdoor thermometer, an indoor thermometer.

Directions for making a demonstration thermometer follow:



A strip of oaktag 7″ x 22″; one yard each of white and red ribbon, $\frac{1}{2}$″ wide.

Place the oaktag lengthwise in front of you.

One-half inch from the bottom, color or paste a red ball, 1″ in diameter.

Show the thermometer by drawing 2 vertical lines starting at the red ball. These lines should be $\frac{1}{2}$″ apart and $18\frac{3}{4}$″ long.

Make degree lines $\frac{1}{4}$″ apart and mark them as shown at the left. Indicate 32° as freezing.

Sew one end of the red ribbon to an end of the white ribbon. With the thermometer facing you, cut a slit at the top of it and slip the end of the white ribbon through. Cut a slit at the top of the mercury bulb and slip the red ribbon through. Pull and tape the ribbon ends at the back so the ribbon lies flat. By sliding the ribbon you may show temperature changes.

(Continued on next page.)

(Continued from page 90.)

Developmental Activity

In the autumn when the temperature first drops, young children are often negligent about wearing sweaters or light coats outdoors. To have children become aware of temperature changes, show a large outdoor thermometer and explain its use. Tell the children that we measure how tall something is in inches or feet, we measure how hot or cold something is in degrees.

When the red line (mercury) drops to 60 degrees you should wear a sweater to be warm. If the mercury drops to 50 degrees, a light coat should be worn.

Have the children help select a suitable place to hang this thermometer.

Another thermometer should be used to check the temperature in the classroom. This should help children see the need for removing sweaters and coats indoors.

The children will enjoy manipulating two demonstration thermometers. One should show the indoor temperature, the other the outdoor temperature for a given time. While the children's interest is high, record the readings from the real thermometers onto a chart like those on page 92.

Procedure

Let us look at the picture on page 91. What is the object on the right-hand side of the page? [thermometer] **Who can find one like it in our room? Do we have one like it outside our window? What is it used for?**

Find the red line on the thermometer. What numerals is it between? [60 and 70] **That is good schoolroom temperature. What does the writing on the sign or label to the left of the thermometer say?**

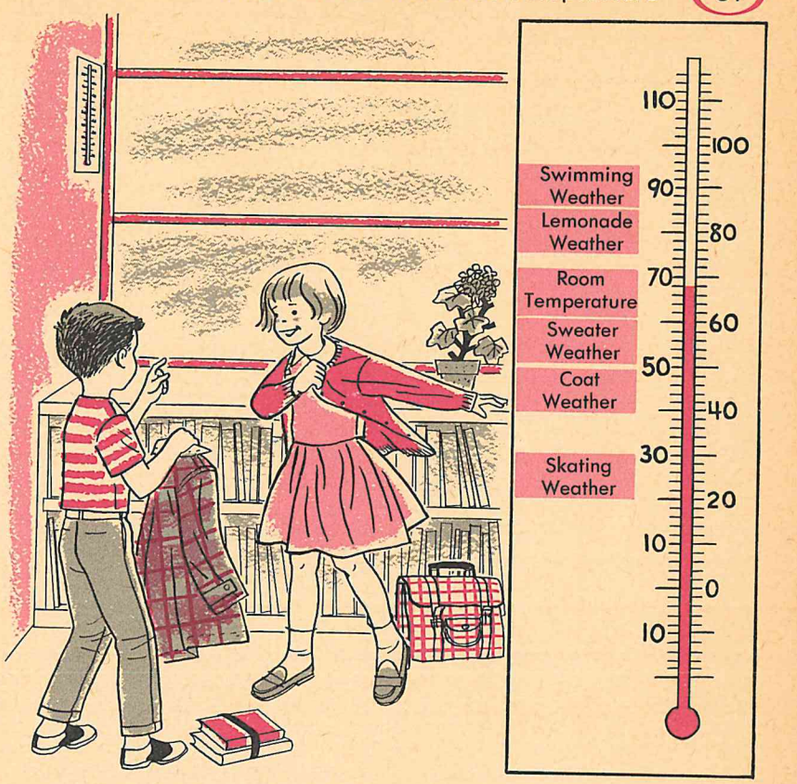
Who can read the label next to 90 degrees? At what time of the year do we enjoy swimming?

What does the label near 80 degrees say? What do you think "Lemonade Weather" means?

When the temperature drops to about 60 degrees, what should we wear? The girl in the picture is showing us. What does the label say? If it becomes still colder, what must we wear?

What does the last label read? When the temperature is less than 25 degrees for a few days in a row there may be ice skating on small lakes and ponds. Even though the temperature is low, it is not skating weather unless the ice is thick enough for safe skating.

When we say 90 degrees is swimming weather or 60 degrees is sweater weather, we mean 90 degrees above zero and 60 degrees above zero. Zero is the starting point on our thermometer.



Extended Activity

Have the children draw pictures of various seasonal activities. Have them label each picture with an approximate temperature at which the activity might take place.

If a child has read about or traveled to a place where temperature is quite different from that of his home locality, encourage him to draw a picture of the place, including some of its inhabitants (clothing worn is a temperature clue). Have him label the picture with an appropriate temperature.

This activity could also be related to likely temperatures for various holidays. You might discuss temperatures and customs in various countries at Christmas. Have the children choose a country, draw a picture about it, write its name, and give an appropriate temperature label.

92 Comparing Temperatures

Month			
Days of Week	Time	Inside	Outside
Monday	9:00		
	1:00		
Tuesday	9:00		
	1:00		
Wednesday	9:00		
	1:00		
Thursday	9:00		
	1:00		
Friday	9:00		
	1:00		

Month			
Days of Week	Time	Inside	Outside
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			

92

Purpose

To give practice in reading thermometers. To record temperatures in pupils' books.

Materials

Demonstration thermometer; indoor, outdoor thermometers.

For the experiment: bottle, red ink, water, glass tubing, ice cubes, stopper with a hole, clay, bowls, plastic drinking straw.

Be sure to read the indoor and outdoor thermometers at 9 o'clock and 1 o'clock on the day you present this lesson.

Developmental Activity

Working with small groups, teach the children to read the thermometer accurately. They have had practice in reading approximate temperatures, but no formal work with reading actual temperatures. Use your large demonstration thermometer for this. You might also refer the children back to page 91.

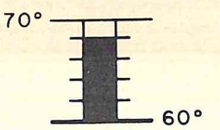
When the children understand how to read temperatures, present page 92.

Procedure

Open your books to page 92.

Have someone read the title of the page. Discuss the charts with the children. **How do you think we will use this page?**

It is best to obtain the temperature for Monday yourself. This is the temperature on the indoor (inside) thermometer. Make a large sketch on the chalkboard similar to this sample:



Draw the "mercury" to show the temperature. Have the children read this. Write this temperature on the board. Point to the degree mark. **What does this symbol stand for? Be sure to write it after your temperature.**

Elicit from the children where they should record this temperature on the chart. Have a child do it. Show his book to the class as an example of correct placement.

Use a similar procedure for the outdoor temperature.

Allow various children to read the temperatures for the rest of the week. You might have three children individually read the indoor thermometer and three children read the outdoor thermometer. Choose different children for each day.

Each child will quietly report his reading to you. If the children obtain 3 different readings, use the average reading.

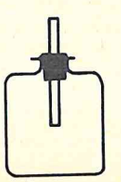
Write the indoor and outdoor temperatures on the chalkboard and have the children record them in their books.

You might save the second chart for later in the semester. Work with it would serve as a review of reading temperatures and could lead to a comparison of temperatures during different months.

Extended Activity

Most children are very curious about why the liquid in a thermometer goes down when it is cold, up when it is hot. The following experiment will help them understand why this happens.

Have the children place a thermometer in a bowl of ice cubes. **What happens?** Then have them place it in a bowl of hot water. **What happens?**



Completely fill a bottle with water colored with red ink or food coloring. Insert a drinking straw and pack the opening of the bottle tightly with clay. (A piece of glass tubing inserted in a rubber stopper is more effective than the straw-clay arrangement.)

(Continued on next page.)

(Continued from page 92.)

Submerge the bottle in a bowl of hot water. **What happens to the red water?** Let the bottle stand at room temperature for a time, then transfer it to a bowl of ice water. **What happens?** Help the children reach the conclusion that when the liquid in the thermometer is heated, it expands and needs more room; hence, it rises in the tube, just as it did in the straw or glass tubing. When the liquid is cooled, it contracts, needs less room; therefore, it falls in the tube. Usually water is not used in thermometers since it expands more than alcohol or mercury.

93

Purpose

To review the triangle, rectangle, circle, and square. To introduce "mi." as the abbreviation for miles.

Vocabulary

Square, circle, rectangle, triangle, mile (mi.), minutes.

Materials

A triangle, rectangle, circle, square, and octagon. Crayons.

Developmental Activity

How many of you ever take trips in your family's automobile? Do you see interesting shapes or designs along the highway? There is always something to see if we look for it. Perhaps if we study the picture in our book, it will help you notice more things the next time you are riding.

Procedure

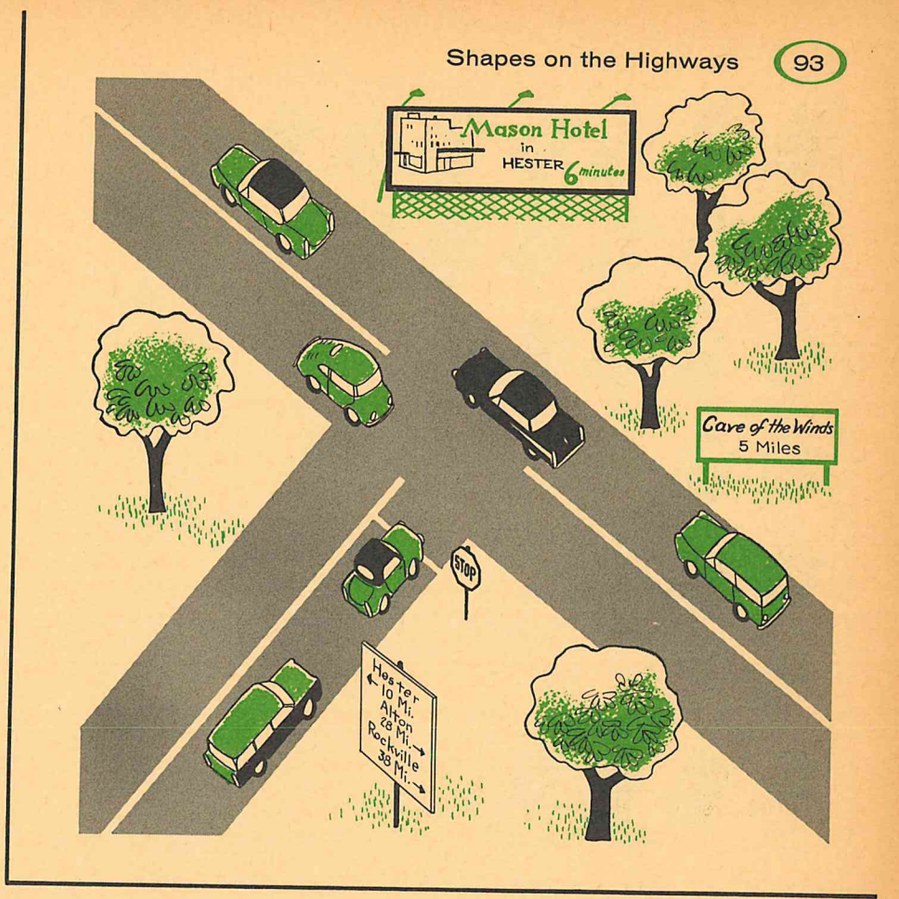
Let us open our books to page 93.

I am going to hold up a shape. See if you can find something like it in the picture. Hold up a triangle. **Look carefully. Put a small green x on each triangle you find.** Allow time for careful observation. **Can you find another? Are there any more?** Have the children take a crayon and outline each of the 3 triangles.

Now we will look for something like this. Hold up an octagon. **Put your hand on it when you find it. What does the sign say? What color is a stop sign? Take your red crayon and color it.**

Do you see anything that suggests roundness? [trees] **Show me the shape with your arms.**

Hold up the square. **What is this shape called? Now find something shaped like this. A sign like the one in the picture tells us names of towns and how far away a driver is from these towns. Does anyone know what "mi." means?** Write "mi." on the chalkboard. [It is a short way to write miles.] **Can anyone read the names of the towns on the sign?** Give help if necessary. **How far away is Hester?** [10 miles] **Alton? Rockville?** Have the children outline the square with black crayon.



Hold up a rectangle. **What is this called? Who can find a sign shaped like this? Who can find another one?**

Which sign tells how far away something is in miles? What is it? [Cave of the Winds] **How far away is it? Could "miles" be written another way?**

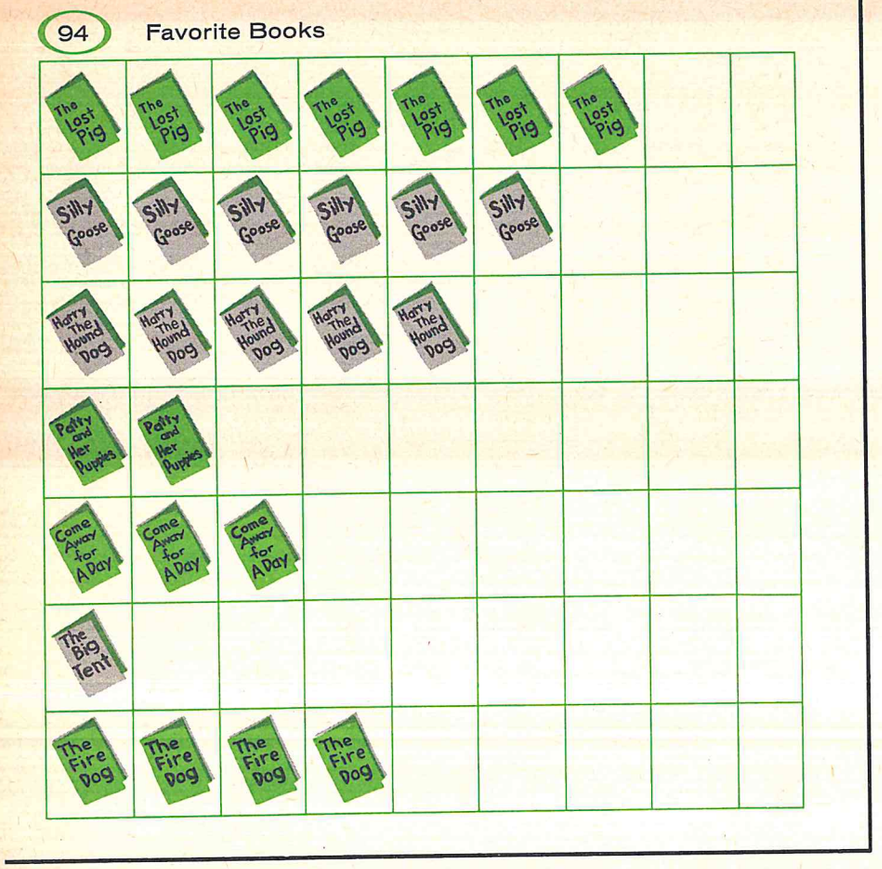
Which sign tells how far away something is in minutes? What do you think that means? Who can read this sign?

Have the children outline the rectangular shapes in green.

If time permits, discuss the right and left sides of the highway. Relate this to the side of the street or road on which children ride their bicycles. Mention highway safety rules.

Extended Activity

Give each child a sheet of paper, paste, and some shapes. Tell him to make a map similar to the one in this book. Have it include a highway and one or more signs. Encourage originality.



94

Purpose

To teach children to read and interpret a simple pictograph. To teach them to make pictographs.

Vocabulary

Pictograph, record, graph.

Materials

Squared tagboard, colored paper 1″ x 2″.

Developmental Activity

Teachers use various methods to encourage children to read library books during free time. Many teachers make visual records of the books which members of the class have read. A pictograph like that described in today's lesson is one such record.

It would be well to begin a pictograph of books read before working with page 94.

Each time a child reads a book, have him make a small booklet by folding a piece of paper 1″ x 2″. He should write the title of the book on the paper and paste or staple it to the class book chart made of squared tagboard. Have booklets made for the same book placed together in rows as on page 94. At first have this done under your guidance.

Procedure

Open your books to page 94. It looks as if some children have made a pictograph of their favorite books just as we have been doing.

Who can read the title of the first book in the upper left-hand corner? ["The Lost Pig"] **Read all of the titles in the first row silently. Are they all the same?** [yes]

Now count to find out how many children have read "The Lost Pig." In the last box write the number of times "The Lost Pig" has been read. What numeral did you write? [7]

Now put your finger on the first book in the second row. What is the name of this book? ["Silly Goose"] **Are all the books in this row the same? How many children read this book?** [6] **In the last box write the number of times "Silly Goose" has been read. Which book was read more, "The Lost Pig" or "Silly Goose"?**

What is the name of the book in the third row? ["Harry the Hound Dog"] **Find out how many times it has been read. Write the numeral to show this in the last box. What did you write?** [5] Use a similar procedure to complete the page.

By looking at the pictograph, we can easily see which book was read by the most children. Which book was this? ["The Lost Pig"] **Which book did the fewest children read? Do you think making a pictograph is an easy way to record information? Is a pictograph easy to read?**

Extended Activity

In our lesson today we worked with a record. It was a record of books children had read. Perhaps our class would like to make a record like this of science books we read.

Let the children make a pictograph themselves. Give help only if it is absolutely necessary.

95

Purpose

To extend the understanding of the numeral 14 and the word fourteen. To explore some of the ideas these symbols represent.

Materials

A set of 14 counters for each pupil. A chalkboard number line.

Developmental Activity

Put the numeral 14 on the chalkboard. **What number does the numeral stand for?** [14] **What is another way to read this numeral?** [1 ten and 4 ones]

Put 14 counters on the desk in front of you. What number names for 14 can we make with two groups? Each group should have no more than 9 counters in it. Have pupils take turns writing number pairs on the chalkboard. The following five sets are possible for 14:

$9 + 5 = 14$ $\quad$ $8 + 6 = 14$ $\quad$ $7 + 7 = 14$
$5 + 9 = 14$ $\quad$ $6 + 8 = 14$

Have each one shown on the number line.

What other names for 14 can we write? Explore some, including groups of more than 9—$3 + 3 + 3 + 5$, $4 + 4 + 6$, $10 + 4$, $12 + 2$, etc. When the pupils have demonstrated a good grasp of this, go on to Procedure.

Procedure

Open your books to page 95.

Draw a ring around the numeral 14 in the middle of the page. Draw a line under the word "fourteen." Write the word "fourteen" on the lines. It is started for you.

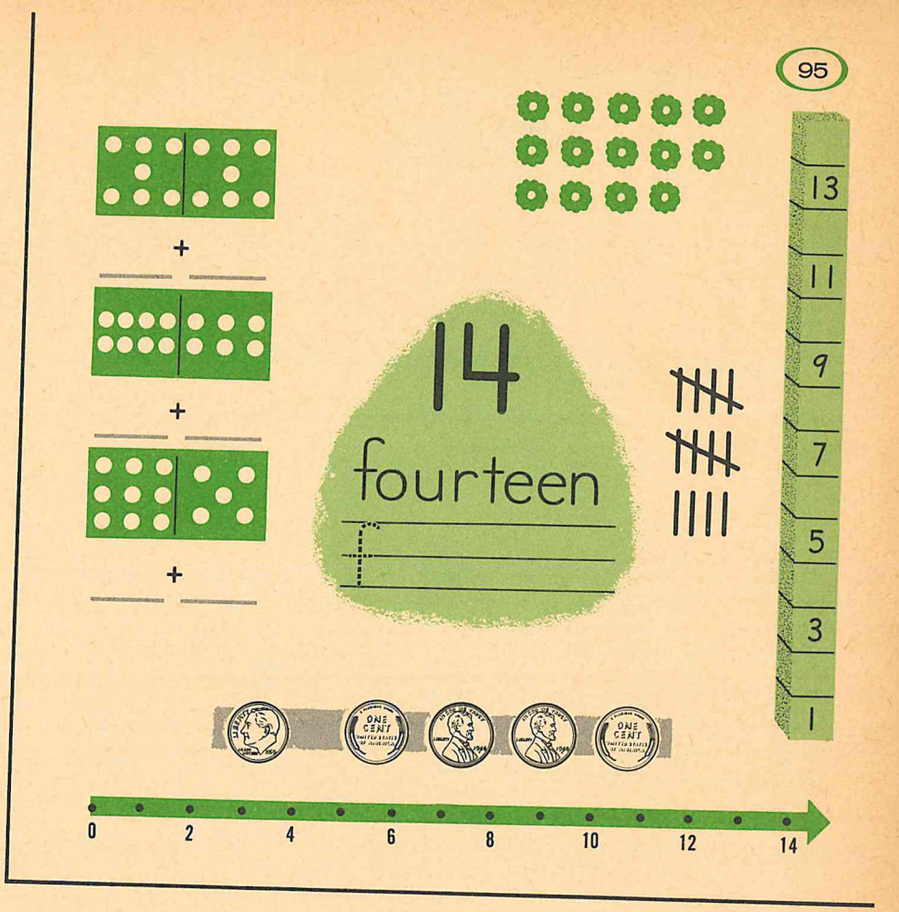
Find the column of dominoes. What number name for 14 does the first domino suggest? [$7 + 7$] **Write it on the lines. What number name is suggested by the second domino?** [$8 + 6$] **Write it. Tell me the number name for the third domino.** [$9 + 5$] **Write it.**

Find the money. What number sentence does the money suggest? [$10 + 4 = 14$ or $10 + 1 + 1 + 1 + 1 = 14$]

Find the tallies. What number sentence do they suggest? [$5 + 5 + 4 = 14$]

Find the number line. Write in the missing numerals. What are they? [1, 3, 5, 7, 9, 11, 13] **Are they odd or even?**

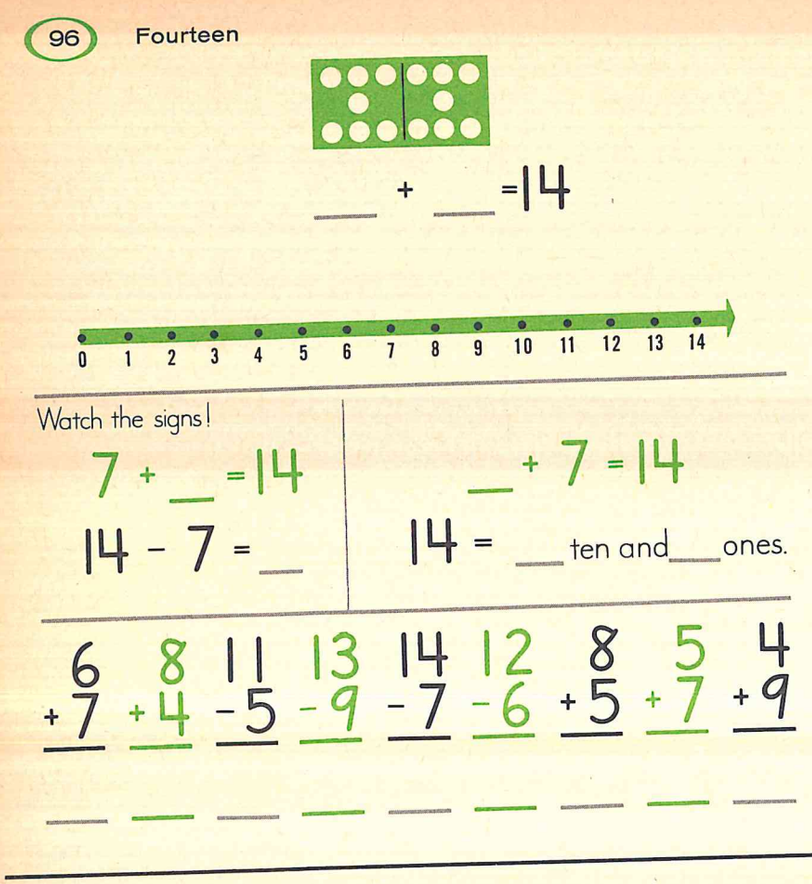
Look at the tower of blocks. How many blocks are there? [14] **Write in the missing numerals. Are they odd or even?**



Look at the cookies. What number sentences do they suggest. Explore. [$5 + 5 + 4 = 14$ or $3 + 3 + 3 + 3 + 2 = 14$]

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **How many pairs of addition facts for 14 can you find with 14 counters? Write them.** There are 5.



Purpose

To develop an understanding of the addition and subtraction relationships in 7, 7, and 14.

Materials

A set of 14 counters for each pupil, a chalkboard number line.

Developmental Activity

Put 14 counters on your desk. How many names for 14 can we make by using addition and subtraction pairs? Let's write each one on the chalkboard. Have individual pupils write them on the board. Five addition and 5 subtraction facts should be listed.

As each subtraction fact is developed, it is important to draw from the children the related addition facts—for example, for $14 - 8 = 6$, the addition facts $8 + 6 = 14$ and $6 + 8 = 14$.

When $14 - 8 = 6$ is developed, ask the children if they can tell the whole story about 14 and 6 and 8. **What other number sentences can we write?** List these on the chalkboard.

A number line should be used to show these relationships. See page 54.

Procedure

Open your books to page 96.

What is the number word at the top of the page? [fourteen]

Now look at the domino. What number sentence does it suggest? [$7 + 7 = 14$] **Write in the missing numerals.**

Draw the number sentence story on the number line.

On the bottom part of the page write in the missing numerals. Watch the signs!

Work the addition and subtraction examples.

Extended Activity

Have each pupil make a set of 3″ x 5″ flash cards for the addition and subtraction facts in 14.

97

Purpose

To extend understanding of the addition and subtraction relationships in 5, 9, and 14.

Materials

A set of 14 counters, a chalkboard number line. A set of 14 cookies, toy autos, etc.

Developmental Activity

Place 14 counters in a straight row. Separate them into a group of 5 and a group of 9. How many number sentences can we write about these groups? Through discussion develop all the possible statements:

$5+9=14$	$14-9=5$	$9+\_\_=14$	$\_\_+9=14$
$9+5=14$	$14-5=9$	$5+\_\_=14$	$\_\_+5=14$

Have pupils take turns showing each of these on the number line.

Now for something new. Put a set of 14 things on the table. They should all be similar—cookies, toy autos, etc. Have pupils make up oral story problems about these objects. Focus on 9 and 5 in these problems. The number sentences just developed would be used to solve the problems.

Give the children plenty of time for this activity. Perhaps the children will make up only a few types of problems the first time. If this happens, accept the problems and go on to Procedure. The important development is the oral statement of problems by the pupils. This should help later in written work.

Procedure

Open your books to page 97.

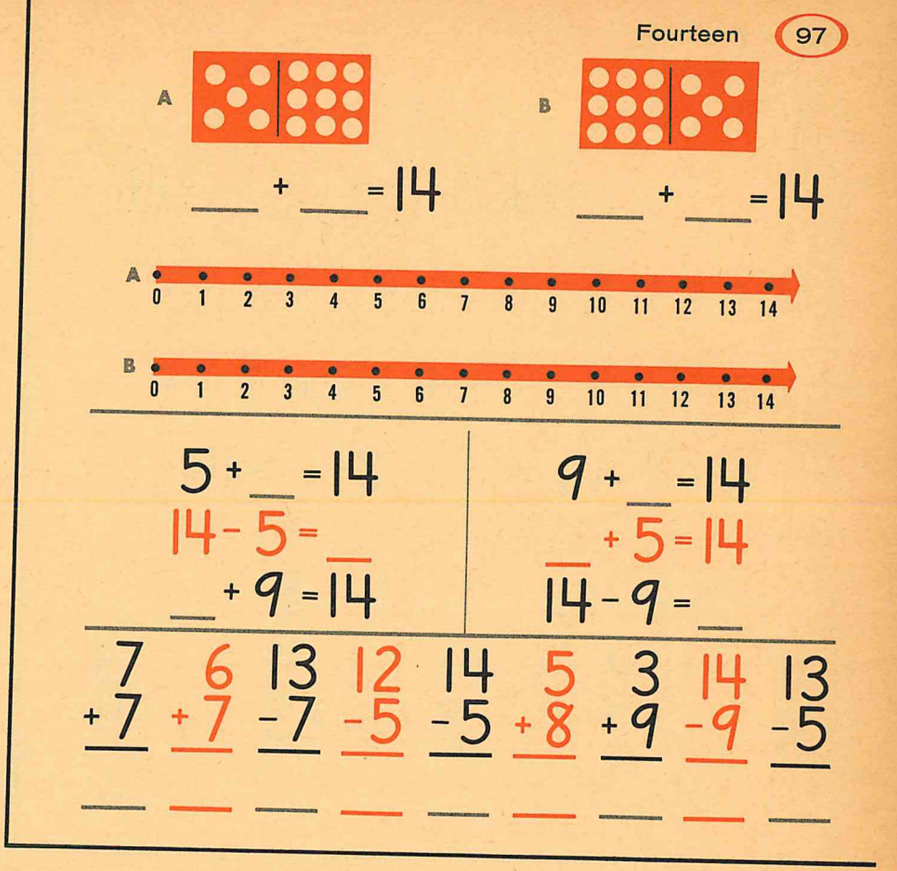
What is the number word at the top of the page? [fourteen]

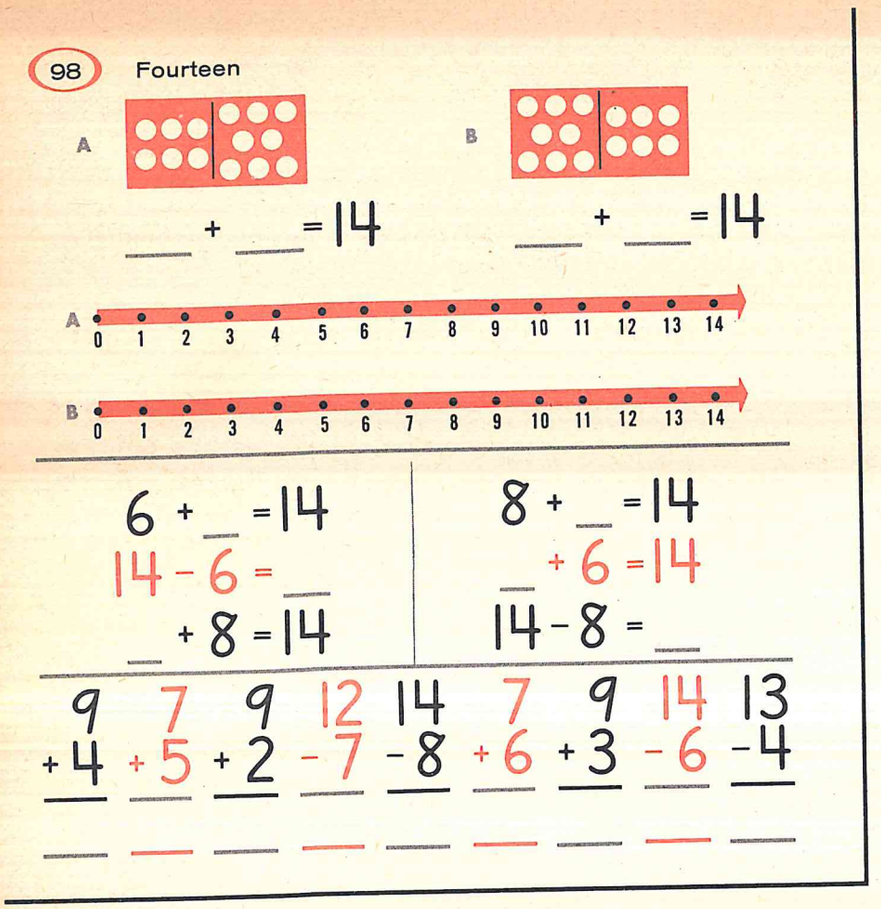
What is the sentence for domino A? [5 + 9 = 14] **Write the number sentence under each domino. Then show them on number lines A and B.**

Write the missing numerals in the number sentences at the bottom of the page. Work the examples. Watch the signs! Use counters to help if you wish.

Extended Activity

Play "Swing on a Star" (page 72). Write a 5 in the center first. Then use 3, then 4. Work for speed and accuracy.





98

Purpose

To extend understanding of the addition and subtraction relationships in 6, 8, and 14.

Materials

A set of 14 counters for each pupil. A chalkboard number line. A set of 14 toy autos or similar objects.

Developmental Activity

Place 14 counters in a straight row. Separate them into a set of 6 and a set of 8. How many number sentences can we write about these groups? Develop all the possible statements through oral discussion. Have pupils put the sentences on the chalkboard:

$6+8=14$	$14-6=8$	$\_+8=14$	$8+\_=14$
$8+6=14$	$14-8=6$	$\_+6=14$	$6+\_=14$

Have pupils show each of these sentences on the number line.

Put the 14 toy autos on the table. Have the pupils suggest number stories. Solutions would use the number sentences that were just presented. For example—There were 14 autos in the parking lot. Eight were driven away at noon. How many are left? Have pupils act out the stories.

Procedure

Open your books to page 98.

What is the number word at the top of the page? [fourteen]

Write the missing numerals under each domino. Show the number sentences on the number lines.

Write the answers on the lines on the bottom part of the page. Work the addition and subtraction examples, also. Use counters to help if you wish. Circulate and help as needed.

Extended Activity

Put the number pair 6, 8 on the chalkboard. Have the pupils make up as many number sentences as they can, using these numbers. Sentences may be written on 6″ x 9″ ruled newsprint.

6, 8

$6+8=\_$	$6+\_=14$
$8+6=\_$	$8+\_=14$
$\_+8=14$	$14-\ \ 8=\_$
$\_+6=14$	$14-\ \ 6=\_$

Have the pupils write each open sentence with pencil. Have them write the missing numerals with crayon. This makes it possible to complete each sentence and at the same time reveal special relationships.

99

Purpose

To extend the concepts for 11, 12, 13, and 14 by using three addends.

Materials

A set of 14 counters for each pupil.

Developmental Activity

Take out a set of 14 counters. Remember the number game we played by making up number names using three numbers? For 14, we might say 6 and 6 and 2. Can you show this with your counters?

Today we are going to see how many number names for 14 we can make by using three sets of 9 or less. As number names are suggested, do two things:

(1) Have the pupils show the name with their counters.

(2) Have a pupil write the number sentence on the chalkboard.

As many solutions as possible should be organized on the chalkboard:

$1+4+9=14$ $\quad$ $1+5+8=14$

$1+6+7=14$ $\quad$ $1+6+7=14$ $\quad$ etc.

Zero will not be suggested as an addend if pupils show the name with their counters. If it is mentioned, say that zero will not be used today.

Procedure

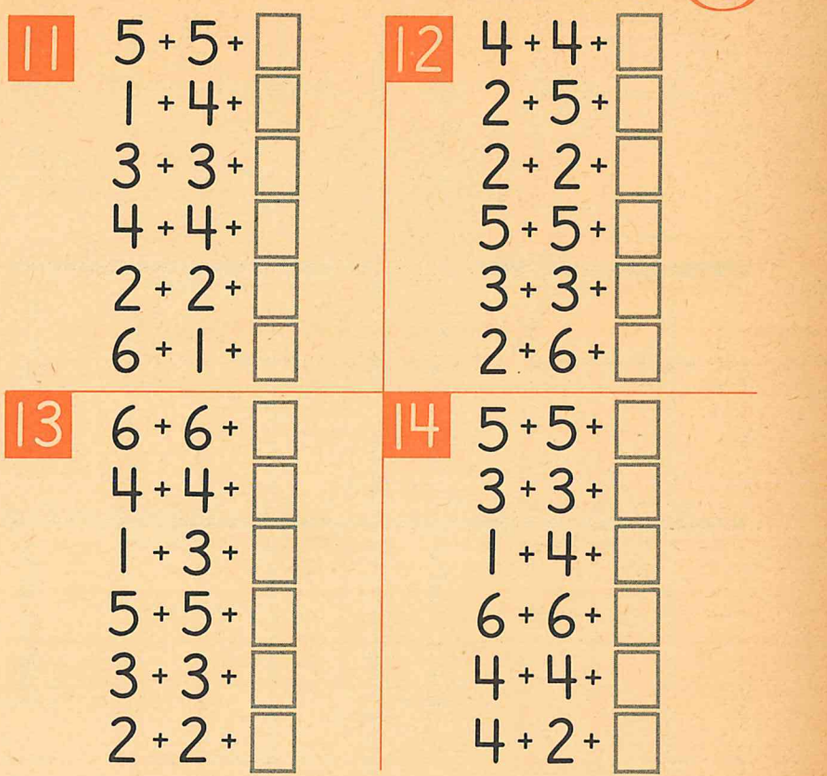
Open your books to page 99.

In each of the boxes you will see a set of unfinished number names. Complete each one so that it is another name for the number at the top of the box. Put your answer in the empty frame. Demonstrate this on the chalkboard. **An empty frame tells us that a numeral is missing. Work neatly.**

Circulate and give help as needed.

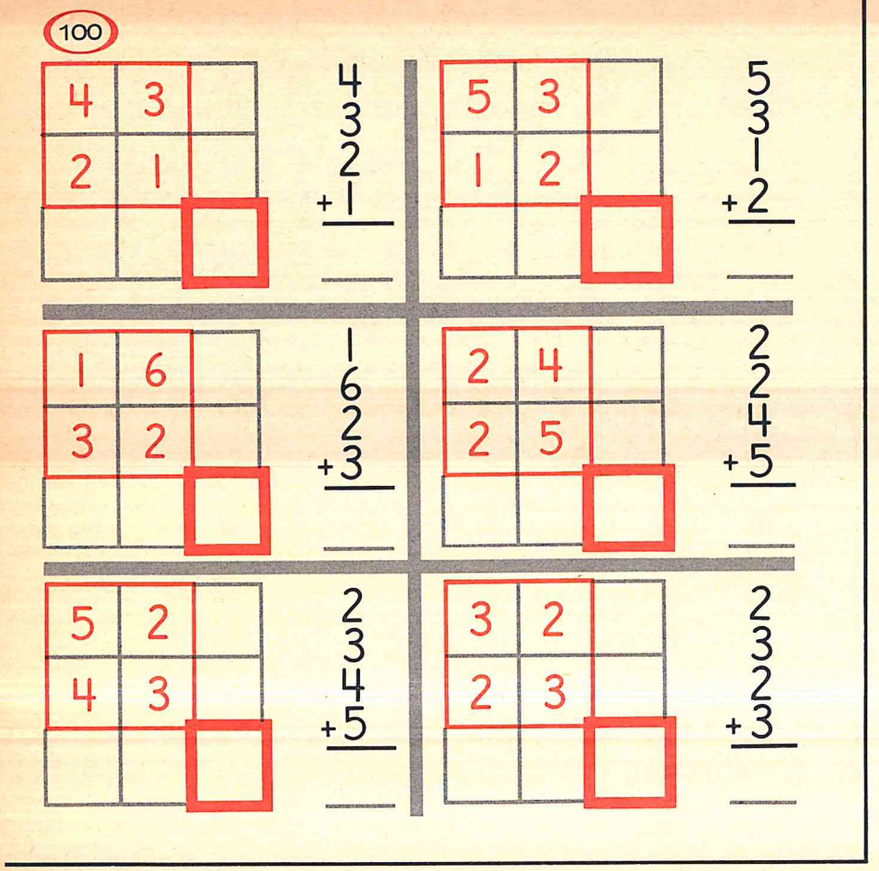
Following completion of this page, ask the pupils if they noticed anything special about this set of additions. Many of the pupils will have noticed the doubles. Discuss the idea that adding the doubles first is a quick, easy way to add. A few examples on the chalkboard would help illustrate the point:

$$\begin{array}{r} 4 \\ 5 \\ +\,4 \\ \hline \end{array} \Big\rangle\, 8+5 \qquad \begin{array}{r} 5 \\ 2 \\ +\,5 \\ \hline \end{array} \Big\rangle\, 10+2$$



Extended Activity

Pass out 6″ x 9″ ruled newsprint. **Write the numeral 14 at the top of your page. Write as many names for 14 as you can. Use addition with either two or three numerals.** Having pupils check each other's papers will give the children additional practice with number names.



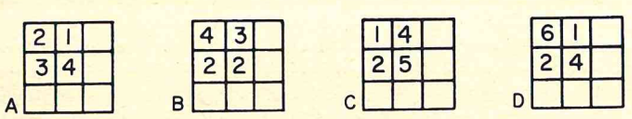
100

Purpose

To extend understanding of the grouping property in addition.

Developmental Activity

Put number square A on the chalkboard. Write in the numerals 2, 1, 3, and 4 as shown. Have the pupils add across: $2 + 1 = 3$; $3 + 4 = 7$. Then have the children add down: $2 + 3 = 5$; $1 + 4 = 5$. Adding the answers gives 10. Repeat this procedure with squares B, C, and D.



Next make column addition examples with the set of four numbers from each number square. Discuss the examples. **Does it make any difference in which order we add the numbers?** Keep generalizations in the pupils' own words.

Procedure

Open your books to page 100.

These examples are just like the ones we have been doing. Go ahead and work them. Raise your hand if you have a question.

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the pupils draw four number squares. Let them put in their own numerals. Evaluate the results. Some of the examples may go far beyond the children's usual level of addition.

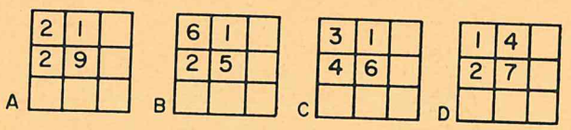
101

Purpose

To extend understanding of the structure of the 14-group.

Developmental Activity

Put number square A on the chalkboard. Have the pupils add across: $2 + 1 = 3$; $2 + 9 = 11$. Then have them add down: $2 + 2 = 4$; $1 + 9 = 10$. Adding the answers gives $3 + 11 = 14$ and $4 + 10 = 14$. Do this with squares B, C, and D.



Next make column addition examples with the set of four numbers from each number square:

1	1	1	1
2	2	3	2
2	5	4	4
+9	+6	+6	+7

All the answers are 14. Discuss this.

Procedure

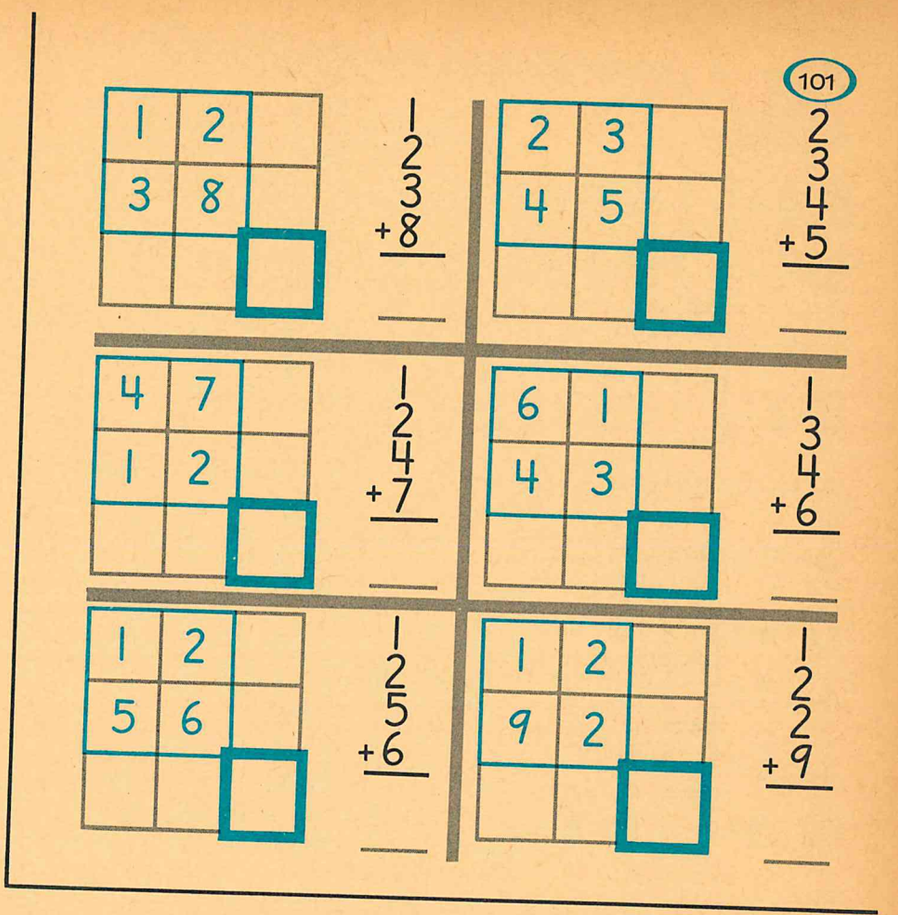
Open your books to page 101.

These examples are like the ones we have been working. Go ahead and work them. Raise your hand if you have a question. Are we sitting up tall?

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the pupils draw four number squares. **Put 1, 2, 4, and 7 in four different arrangements. What answer do you always get in the bottom right-hand box?** [14]



102

Addition

6+6=	9+5=	3+9=	7+5=
5+9=	5+8=	6+7=	4+9=
7+6=	8+4=	9+4=	8+6=
4+8=	7+7=	5+7=	9+3=
		6+8=	8+5=

Subtraction

12−4=	13−9=	14−9=	13−6=
14−7=	14−5=	12−7=	12−9=
13−8=	13−4=	13−5=	13−7=
12−3=	12−6=	12−8=	12−5=
		14−8=	14−6=

ADDITION SCATTERGRAM

NAME	12							13							14				
	9 +3	8 +4	7 +5	6 +6	5 +7	4 +8	3 +9	9 +4	8 +5	7 +6	6 +7	5 +8	4 +9		9 +5	8 +6	7 +7	6 +8	5 +9

Make a scattergram for the subtraction examples, also. Use it as you are using the addition scattergram.

SUBTRACTION SCATTERGRAM

NAME	12							13							14				
	12 -9	12 -8	12 -7	12 -6	12 -5	12 -4	12 -3	13 -9	13 -8	13 -7	13 -6	13 -5	13 -4		14 -9	14 -8	14 -7	14 -6	14 -5

Extended Activity

Have the pupils make a list of the examples they missed. Then have them practice each example with their counters.

102

Purpose

To test the addition and subtraction facts in 12, 13, and 14.

Materials

A set of 14 counters for each pupil.

Procedure

Open your books to page 102.

Write the answer to each example in the frame. What is the top part of the page? [addition] **What is the bottom part of the page?** [subtraction]

When you have finished the page, go back and check each example with your counters.

Make a scattergram showing the addition errors made by each pupil. If a particular example or group of examples is missed by a sizable number of pupils, reteach the troublesome combinations.

103

Purpose

To provide maintenance work with place value on the abacus.

Materials

An abacus.

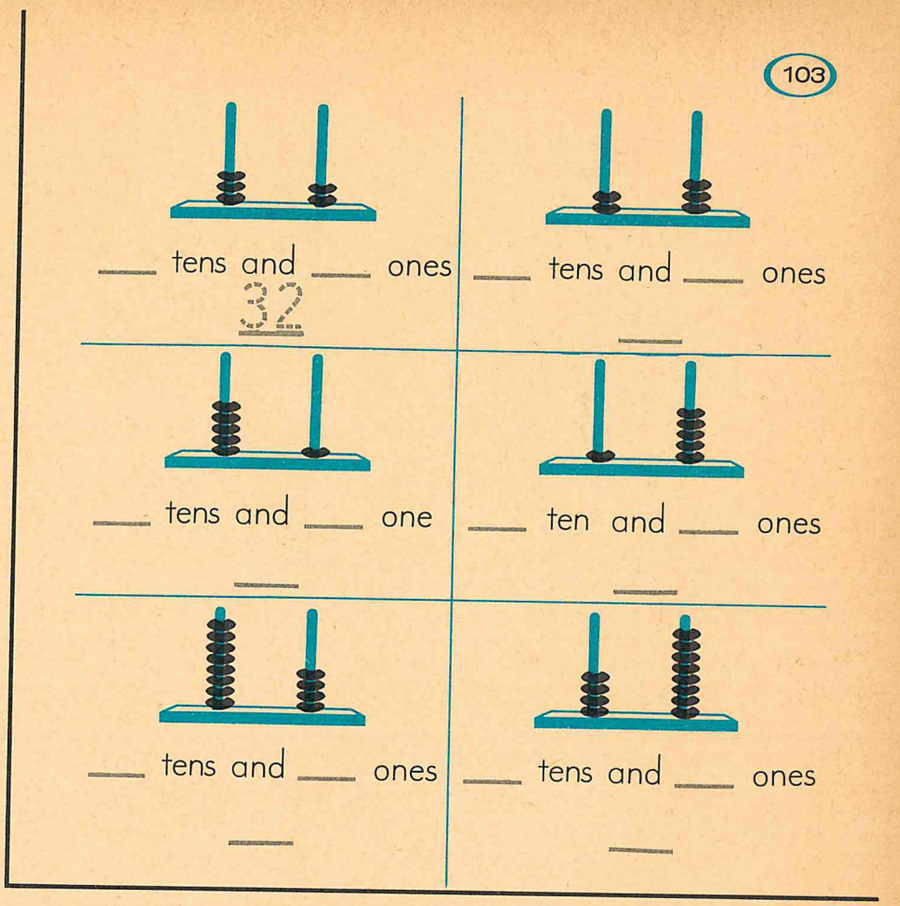
Developmental Activity

Show the children an abacus or draw one on the chalkboard. Point to the abacus. **Who remembers the name for this? Which column is the ones' column? Which is the tens' column? Here is our first number.** Show 42 on the abacus. **Raise your hand if you can read it.** Call on someone after a moment. [42] **Let's read 42 the long way—4 tens and 2 ones.** Then have a pupil write the numeral 42 on the chalkboard. Follow this procedure for 46, 53, 57, 31, 38, 22, and 26.

Procedure

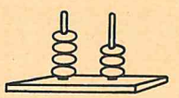
Open your books to page 103.

What number does the first abacus show [32] **Let's read 32 the long way—3 tens and 2 ones. Write the numerals for 3 tens and 2 ones. Then write the numeral 32 on the line. It is started for you. Work the others the same way. Write carefully!**

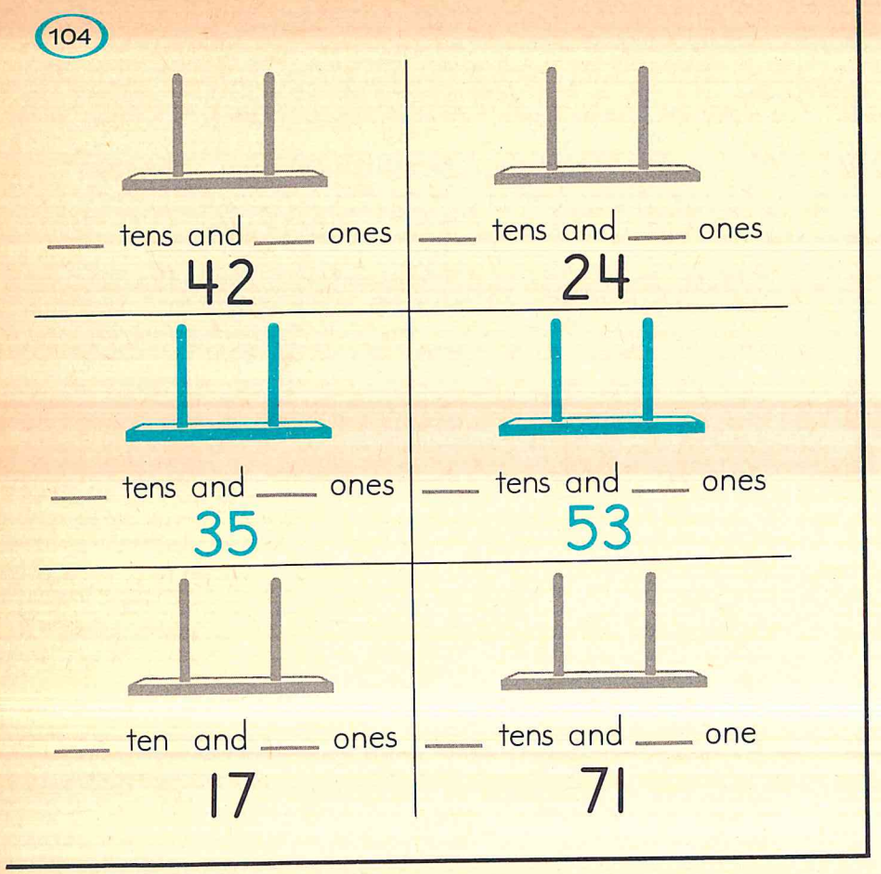


Extended Activity

Put this model on the chalkboard:

43	4 tens and 3 ones	
23		
37		
30		
26		
17		
15		
25		
40		

Have the pupils copy and complete it on 9″ x 12″ newsprint folded vertically into thirds. To give room for drawing the abaci, have 4 examples copied on the front of the paper and 5 on the back.



104

Purpose

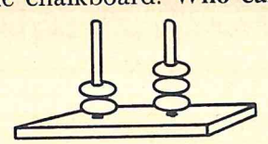
To provide maintenance work with place value.

Materials

An abacus.

Developmental Activity

Write the numeral 23 on the chalkboard. **Who can show us this numeral on the abacus?**



Point to the tens' place. **This column stands for ____.** [2 tens] Point to the ones' place. **This column stands for ____.** [3 ones] **What is the long way to read 23?** [2 tens and 3 ones] Repeat for 44, 49, 65, 61, 88, 82, 95, and 99. Work as rapidly as the group can proceed. Make up some additional examples if more practice is needed.

Procedure

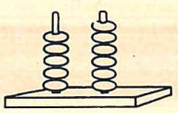
Open your books to page 104.

What numeral is in the first box? [42] **You are to do two things in each box: First, write the numerals to tell how many tens and how many ones. Then draw the beads to make the abacus show the number name.**

Circulate and help as needed.

Extended Activity

Put this model on the chalkboard:

56	5 tens and 6 ones	
63		
47		
81		
52		
74		
66		
44		
55		

Have the children copy and complete it on 9″ x 12″ newsprint folded vertically into thirds. To give room for drawing the abaci, have 4 examples copied on the front of the paper and 5 on the back.

105

Purpose

To keep a pictorial record of the weather for a month. To summarize information presented in pictorial form. To extend work with the calendar.

(Continued on next page.)

(Continued from page 104.)

Vocabulary

Sunny, rainy, foggy, windy, summarize, symbol.

Materials

Butcher paper for making a calendar, colored paper for making symbols.

Developmental Activity

You may make a pictorial weather record for any month. It is a good idea to put this information on a 22″ x 28″ chart of butcher paper or oaktag. You should make only the squares. The weather symbols may be planned jointly by the children and you. Have one of the children write the appropriate year and month.

At the beginning of a given month, encourage the children to observe the weather for each day and to make the appropriate symbol for the kind of weather for that day. Have them put the correct numeral for the day in the box.

The class does this for a month. At the end of that time, the children may make a co-operative summary chart like the following:

In January we had 6 days of sunshine.
It rained for a week, or 7 days.
We had foggy weather for 4 days.
We had good kite-flying weather 5 days in a row.

Procedure

If the children have had a firsthand experience as described in the Developmental Activity, they are ready to discuss page 105.

Open your books to page 105.

The title tells what the page is about. Who can read it?

The symbols on this page are very much like the symbols we made to suggest different kinds of weather. What kind of weather does the first symbol stand for? What kind of weather does the second symbol stand for? Who can read the next symbol? Who can draw this symbol on the chalkboard?

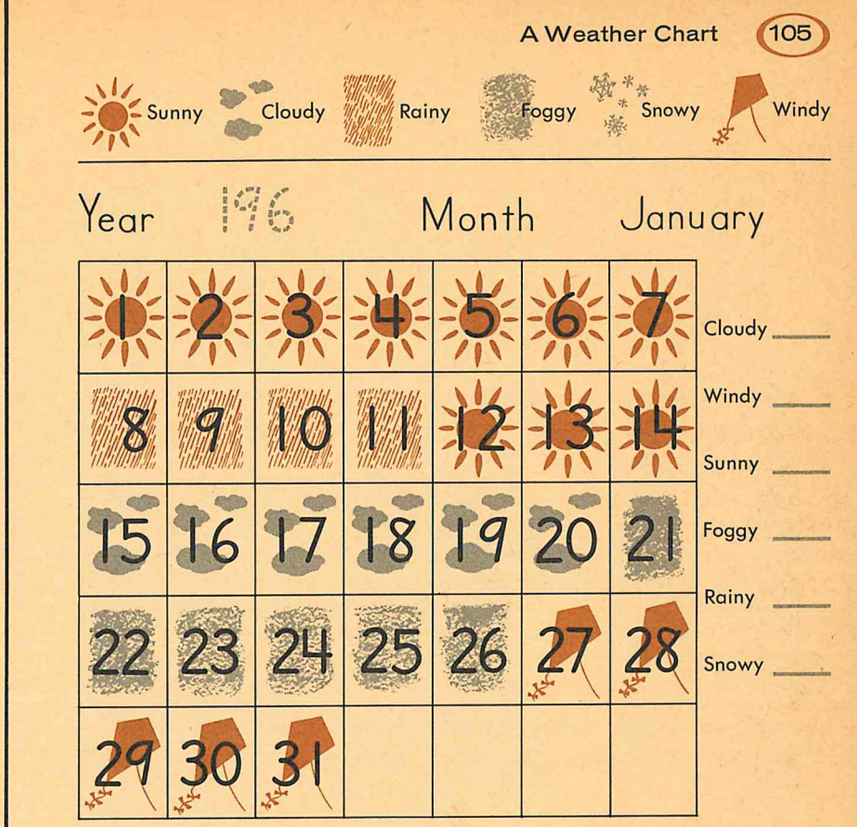
Who can find the word "foggy"?

Who can find the word "snowy"? Who can find the symbol for snowy weather?

What is the last symbol? What does it mean? Why is a kite a good symbol for a windy day?

Now look at the word "year." Who can write the numerals for this year? Put a line under these numerals.

Now look at the word "month." Put a ring around it. What month is the calendar for?



Find the list of words on the right-hand side of the page. What is the first word? [cloudy] **Count the number of cloudy days. How many were there?** [6] **Write 6 on the line next to the word "cloudy."**

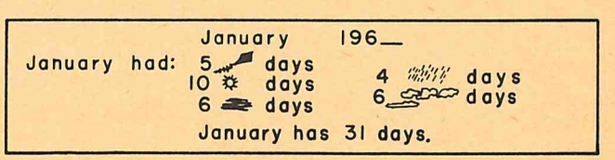
What is the next word in the list? [windy] **How many windy days does the calendar show?** [5] **Where should we write the 5?**

Use a similar procedure for sunny, foggy, and rainy days.

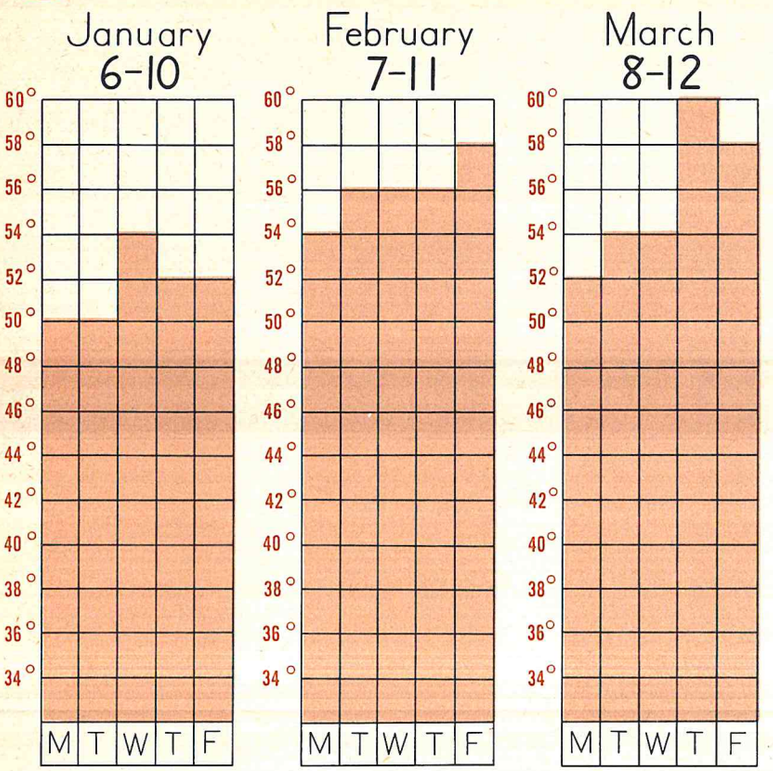
How many days did it snow during this January? [none] **How should we show this?** [by writing zero]

Extended Activity

Some of the children might make summary charts of their own. They might be like this:



106 Graphs Showing Temperature Changes



106

Purpose

To learn to read graphs.

Vocabulary

Graph, weather, degrees, high, low, thermometer, lower temperature, warmer, colder, pictograph.

Materials

Tagboard 24″ x 36″ or newsprint marked as shown in the pupils' book, outdoor thermometer.

Developmental Activity

Primary children can learn to read and make simple graphs.

Page 106 is a discussion page which requires the children to get several pieces of information from a graph and use this information to make comparisons.

After the children have worked through the page, they might make a class weather graph of their own for one or more weeks.

Procedure

Let us open our books to page 106. Who can read the title of this page?

These graphs show what the thermometer outside a second grade classroom read on some days last year.

Most thermometers have a mark for every two degrees of temperature. So when the children wrote the temperatures along the side of their graph, they wrote the numerals for every two degrees. They used this symbol ° (write ° on the chalkboard) **for degrees.**

The children in the class read the outdoor thermometer at the same time each day. Then they colored the squares in their graph to show the temperature. At the bottom of the graph are the letters M T W T F. What do they mean? [days of the week]

> Be certain children realize that the temperature is not constant throughout the day. The temperatures on the graphs are recorded at the same time each day.

Let us look at the first graph on the left-hand side of the page. Starting at the bottom, who can read the degrees?

What was the temperature shown on the thermometer on Monday, January 6? [50 degrees] **What was it on Tuesday, January 7?** [same]

Did the temperature go up or down on Wednesday? [up] **How many degrees did it go up?** [4 degrees]

What happened on Thursday? [Temperature went down.] **How many degrees did it go down?** [2 degrees]

Did the temperature change on Friday? [no] **What temperature did the children show on the graph for Friday?** [52 degrees]

What day had the highest temperature on this graph? [Wednesday] **What was the highest temperature?** [54 degrees]

Have the children draw a line with a crayon across the top of the temperature shown for each day. Ask a child to read the temperatures for the week.

Use a similar procedure for the other graphs on the page. Have the children compare temperatures for these weeks.

Draw from the children a simple definition of a graph.

Extended Activity

Using squared newsprint or tagboard (see Materials), let those children who have the interest record on a similar graph, the daily temperature at the same time each day. They might do this for a week or possibly longer. This might be a group project or children might work individually. If this is an individual project, each child may take his graph home and explain it to his parents.

107

Purpose

To learn the sequential pattern for writing numerals from 101 to 200.

Vocabulary

Names of the numerals from 101 through 200.

Materials

Squared newsprint.

Procedure

Often children find the number system fascinating and will enjoy writing numerals over 100.

Open your books to page 107.

Today we are going to finish a page of numerals that has been started for us.

Can anyone tell what the first numeral in the first row is? [101] If children have difficulty doing this, show them the difference between 100 and 101. **What is the numeral under 101?** [102] **What do you think we should write in the next box?** [103] **How many can finish writing the numerals in the first column? Do it.**

Now let us do the second column. What is the first numeral? [111] **What numeral goes in the box under 111?** [112] **Write it. Who can read the next numeral?** [113] **What comes next?** [114] **Write it. Now complete the column.**

Look at the third column. What is the first numeral? [121] **How many can complete this column? Do it.**

What is the first numeral at the top of the next column? [131] **Write the next three numerals. Read the numeral that has been written for you.** [135] **What comes next?** [136] **Write it. Now finish the column.**

Who can read the first numeral in the next column? [141] **How many can write the next four numerals? What numeral was written for you?** [146] **Finish the column.**

You are now ready to write the numerals that come after 151 and go to 200. Do not write those that are already there.

Give help to those who need it.

When everyone has finished, have them check their papers. A different child could read each column of numbers to the class. This would be good oral practice.

Extended Activity

Give squared newsprint to those who show interest in developing a similar page during free work period.

Fill in the Missing Numerals 107

101	111	121	131	141	151	161	171	181	191
102									
	113								
		124							
			135						
				146					
					157				
						168			
							179		
								190	

108 Counting, Reading, and Writing by 10's to 1000

100	200								
		320							
			430						
				540					
					650				
						760			
							870		
								980	

108

Purpose

To introduce counting, reading, and writing by 10's to 1000.

Vocabulary

All the numerals by 10's from 100 to 1000.

Materials

Squared newsprint.

Developmental Activity

Ask the children if they think they can count from 10 to 100 by 10's. Give several children an opportunity to try this. Then ask whether someone would like to count from 100 to 200 by 10's. Give several children a chance. Then ask who can count from 200 to 300; 300 to 400; 400 to 500; 500 to 600; 600 to 700; 700 to 800; 800 to 900; and 900 to 1000.

See if the children can read the numerals from 100 to 1000 by 10's on the chalkboard. Write these numerals in columns.

Procedure

Open your books to page 108.

Have a child read the title.

Who can tell me the first numeral in the first column? [100] **Who can tell me what numeral goes in the box below it?** [110] **Write it.** See how many can do the first column without looking at the chalkboard.

What is the first numeral in the second column? [200] **What numeral comes next when we count by 10's?** [210] **How many can do the second column?**

What numeral belongs in the first box of the third column? [300] **What numeral comes next?** [310] **Write it. What numeral has been written in for you?** [320] **Can you finish this column?**

Circulate and give help as needed.

What numeral should you write in the first box in the fourth column? [400] **Write it. What numerals go in the next two boxes?** [410, 420] **What numeral has been written in for you?** [430] **What numeral comes next? How many can finish the column?**

You are now ready for 500. See if you can go from 500 to 1000 without help. I will watch you and give help only if you need it.

Encourage those who have the ability to write the numerals from 1000 to 1090 in the last column.

Extended Activity

At some later date give the children squared newsprint and have them do a similar lesson. The numerals may be written horizontally or in vertical columns.

Check these papers before the children take them home.

109

Purpose

To teach children to use a Table of Contents.

Materials

A set of science books or readers. A marker or ruler for each child.

Developmental Activity

Draw a Table of Contents on the chalkboard.

TABLE OF CONTENTS	
Home	1
School	7
The Farm	15
The Airport	26
The Circus	34

Sometimes we use a book to help us learn more about some particular thing. We may look in a book for a story we would enjoy reading. Does anyone know what part of a book would help us find the information or the story? [Table of Contents near the beginning of the book] **The Table of Contents helps us know what is in the book.**

I have put a Table of Contents on the board. What do you think the numerals tell us? To which page would you turn to find about home? [1] **the airport?** [26] **the farm?** [15] **school?** [7] **the circus?** [34]

A Table of Contents can be very helpful if we know how to use it.

Procedure

Open your books to page 109.

What do you see? [a Table of Contents] **Look at it for a minute or two.** (Give the children markers or rulers to help them line up each topic and the page on which it begins.)

Which two words tell you what the book is about? How are they different from the other words?

On the left-hand side of the page is the Table of Contents. On the right-hand side of the page, we will answer some questions about this Table of Contents. Look at the second part of the page. Who can read the writing at the top?

What is the first word? [apples] **Which page would you turn to to find out about apples?** [page 129] **Write 129 on the line.**

What is the second word? [grapes] **To which page would you turn to find out about grapes?** [page 141] **Write 141 on the line.**

Have the children complete the page. Circulate and give help to those who need it.

109

Table of Contents

ANIMALS

Birds	1
Cats	14
Cows	32
Dogs	47
Elephants	83
Horses	114
Lions	122

FRUITS

Apples	129
Bananas	133
Cherries	137
Grapes	141
Oranges	156
Pears	167
Plums	175

To which page would you turn to find out about:

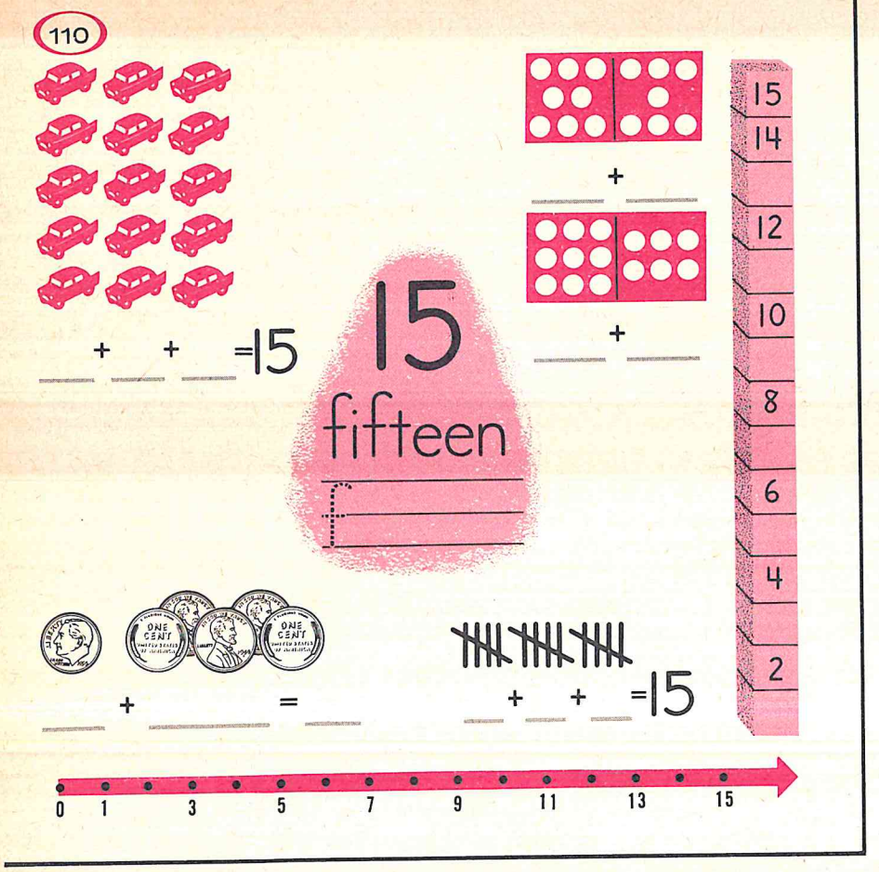
1. Apples_____turn to page _____
2. Grapes_____turn to page _____
3. Dogs_____turn to page _____
4. Pears_____turn to page _____
5. Cats_____turn to page _____
6. Plums_____turn to page _____
7. Birds_____turn to page _____
8. Elephants____turn to page _____
9. Oranges_____turn to page _____
10. Cows_____turn to page _____
11. Cherries_____turn to page _____
12. Lions_____turn to page _____
13. Bananas_____turn to page _____
14. Horses _____turn to page _____

Extended Activity

Give out a set of science books or readers. Tell the group to open to the Table of Contents. Have the children read it. Ask them questions about it. Have them determine whether the pages with small number names are near the front or near the back of the book. Why? **Are the pages with large number names near the front or back of the book? Why?**

A game children enjoy playing is "Charades." Children could use only the Table of Contents of stories which they have read in their reader. One child would act out a story or a character from a story in the reader. The group could first guess which story was being acted out and then could find the page on which the story began.

Children can play another game with the Table of Contents. Have one child ask another to tell on which page you find a particular story listed in the Table of Contents. If the child asked answers correctly, he asks a "on-what-page-do-you-find" question and chooses someone to answer it.



110

Purpose

To extend understanding of the numeral 15 and the word fifteen. To explore some of the ideas these symbols represent.

Materials

A set of 15 counters for each pupil, a chalkboard number line.

Developmental Activity

Write the numeral 15 on the chalkboard. **What number does this numeral stand for? What is the long way to read 15?** [1 ten and 5 ones]

Put 15 counters on the desk in front of you. What number names for 15 can we make with two groups of counters? Each group should have no more than 9 counters in it. This eliminates 10 through 14. Have pupils take turns writing number pairs on the chalkboard. Four sets are possible for 15:

$9 + 6 = 15$ $6 + 9 = 15$ $8 + 7 = 15$ $7 + 8 = 15$

Have each number pair shown on the number line.

What other names for 15 can we write? Explore $5 + 5 + 5 = 15$, $10 + 5$, etc. Have the children show each one with their counters. When pupils have demonstrated a good grasp of the idea, go on to Procedure.

Procedure

Open your books to page 110.

Draw a ring around the numeral 15 in the middle of the page.

Draw a line under the word "fifteen." Then write the word "fifteen" on the lines. It is started for you.

Find the money. What number sentence does the money suggest? Discuss. [$10 + 5 = 15$, $10 + 1 + 1 + 1 + 1 + 1 = 15$] **Write $10 + 5 = 15$ on the lines.**

Find the number line. Which numerals are missing? [2, 4, 6, 8, 10, 12, 14] **What kind of numbers are these?** [even] **Write these on the number line.**

Look at the tallies. Where are they on the page? [lower right corner] **What number sentence do the tallies suggest?** [$5 + 5 + 5 = 15$] **Write it on the lines.**

Find the three columns of toy autos. How many autos are there? [15] **How do you know?** [See 5 rows of 3 autos, etc.] **What number sentence do they suggest?** [$5 + 5 + 5 = 15$, $3 + 3 + 3 + 3 + 3 = 15$] Discuss. **Write the number sentence $5 + 5 + 5 = 15$ on the lines.**

Look at the dominoes. What number name for 15 does the top domino suggest? [$8 + 7$] **Write it. What name for 15 does the second domino suggest?** [$9 + 6$] **Write it on the lines.**

Find the tower of blocks. How many blocks are there? [15] **Write the missing numerals. Are these even or odd?** [odd] **We have learned many things about 15 today, haven't we?**

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **How many even numerals can you write starting with 10?** Take time to make sure the group can proceed on their own. Evaluate carefully.

111

Purpose

To extend understanding of the addition and subtraction relationships in 7, 8, and 15.

Materials

A set of 15 counters, a chalkboard number line, a set of 15 toy autos.

Developmental Activity

Place 15 counters in a straight row. Separate them into a group of 7 counters and a group of 8 counters. How many number sentences can we write about these groups? Through discussion develop all the possible statements. Write each sentence on the chalkboard as it is suggested:

$7 + 8 = 15$	$15 - 7 = 8$	$\_ + 8 = 15$	$8 + \_ = 15$
$8 + 7 = 15$	$15 - 8 = 7$	$\_ + 7 = 15$	$7 + \_ = 15$

Have pupils take turns showing each of these on the number line.

Next put a set of 15 toy autos or similar small objects on a table. Have pupils make up story problems. Solutions will use the number sentences for 8 and 7. Get as many different kinds of problem statements as time and interest permit. For example:

1. Eight green autos and 7 blue autos make 15 autos.
2. There were 15 autos in a parking lot. Seven drove away. How many are left?
3. There were 7 autos in the parking lot. Eight more drove in. How many are parked now?
4. There are spaces for 15 cars in our parking lot. Eight cars are parked already. How many more cars do we have room for?

The important development in this activity is the oral statement of problems by the pupils. This will help later in written work.

Procedure

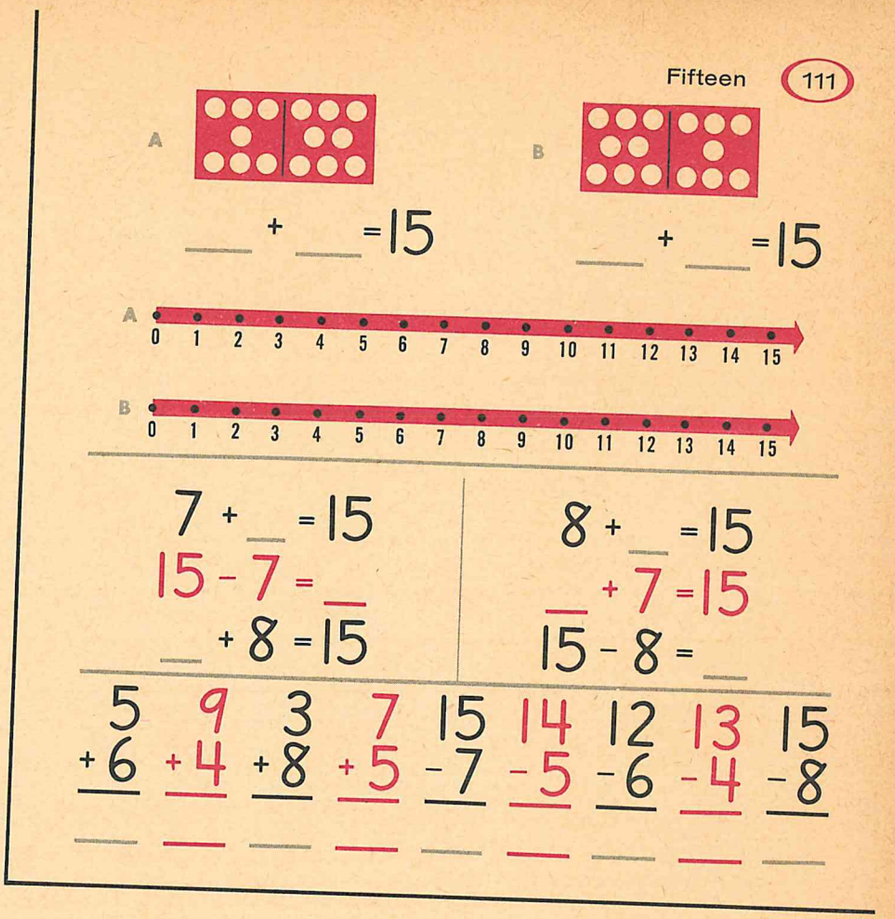
Open your books to page 111.

What is the number word at the top of the page? [fifteen]

What is the number sentence for the A domino? [$7 + 8 = 15$] **Write it under the domino. What is the number sentence for the B domino?** [$8 + 7 = 15$] **Write it.**

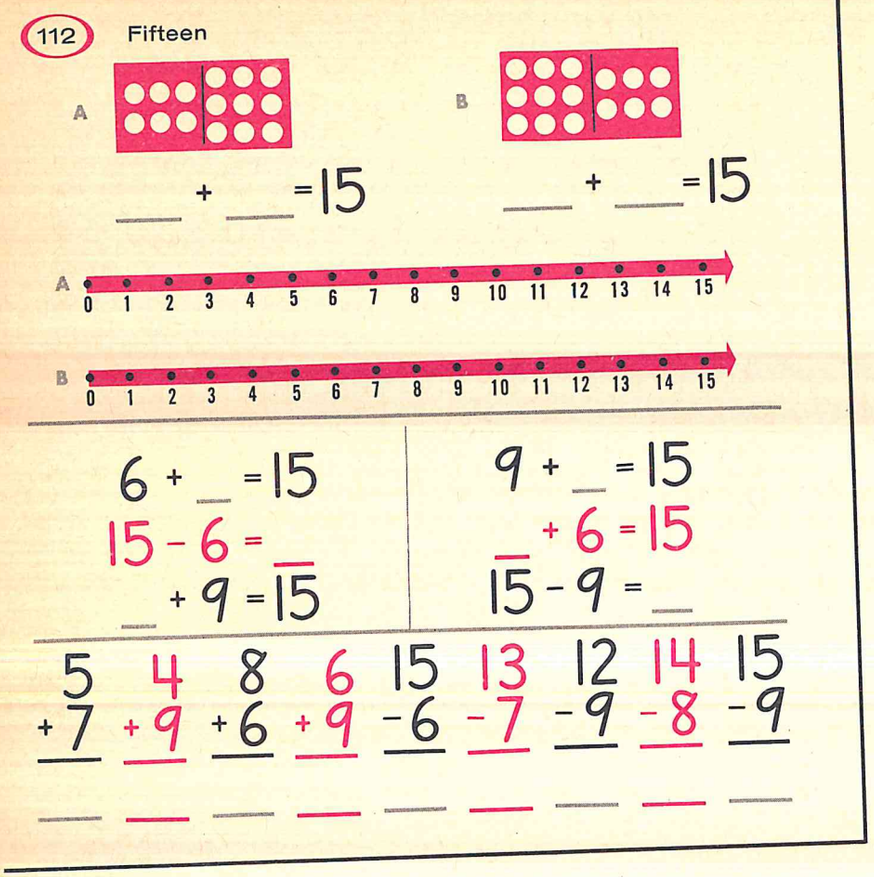
Show these two sentences on number lines A and B.

Then finish the rest of the page. Watch the signs! Use counters to help if you wish.



Extended Activity

Have the children play "Swing on a Star" with 3, 4, 5, or 6 in the center. Directions for playing this will be found on page 72. Work for speed and accuracy.



Next put the 15 toy airplanes on the table. **How many number stories can we make with these airplanes? For example—Six airplanes were at the airport. Nine more landed. How many airplanes are at the airport now?** Encourage variety. As pupils express problems, have the number sentence for each one put on the chalkboard.

Procedure

Open your books to page 112.

What is the number word at the top of this page? [fifteen]

Write the missing numerals under each domino. Show the number sentences on the number lines.

Next write the missing numerals on the lines on the bottom part of the page. Work the addition and subtraction examples. Use counters to help if you wish.

Circulate and give help as needed.

Extended Activity

Put the number pair 7, 8 on the chalkboard. Have the pupils make up as many number sentences as they can with these numbers. Sentences may be written on 6″ x 9″ ruled newsprint. Have pupils write the open sentences with pencil, putting the solutions in with crayon. This makes it possible to complete the sentences and, at the same time, to reveal special relationships.

112

Purpose

To extend understanding of the addition and subtraction relationships in 6, 9, and 15.

Materials

A set of 15 counters for each pupil, a chalkboard number line, a set of 15 toy airplanes.

Developmental Activity

Place 15 counters in a straight row. Separate them into a set of 6 and a set of 9. How many number sentences can we write about these sets? Develop all the possible statements through oral discussion. Have pupils put the sentences on the chalkboard:

$6 + 9 = 15$	$15 - 6 = 9$	$\_ + 9 = 15$	$9 + \_ = 15$
$9 + 6 = 15$	$15 - 9 = 6$	$\_ + 6 = 15$	$6 + \_ = 15$

Have pupils show each sentence on the number line.

113

Purpose

To extend the concept of the missing addend in groups of 12, 13, 14, and 15.

Materials

A set of 15 counters for each pupil, a chalkboard number line.

Developmental Activity

Take out a set of 15 counters. Remember the number game we played by making up number names with three numbers? For 15 we might use 5 and 5 and 5. Can you show this with your counters? Today we are going to see how many number names for 15 we can make, using three groups of 9 or less.

As number names are suggested, do two things:

(1) Have the pupils show the name with their counters.

(2) Have a pupil write the number sentence on the chalkboard. As many solutions as possible should be organized on the chalkboard:

$1 + 5 + 9 = 15$
$1 + 6 + 8 = 15$
$1 + 7 + 7 = 15$
Etc.

Zero will not appear as an addend if pupils show the name with their counters. If zero is mentioned, say that we will not use zero today.

Procedure

Open your books to page 113.

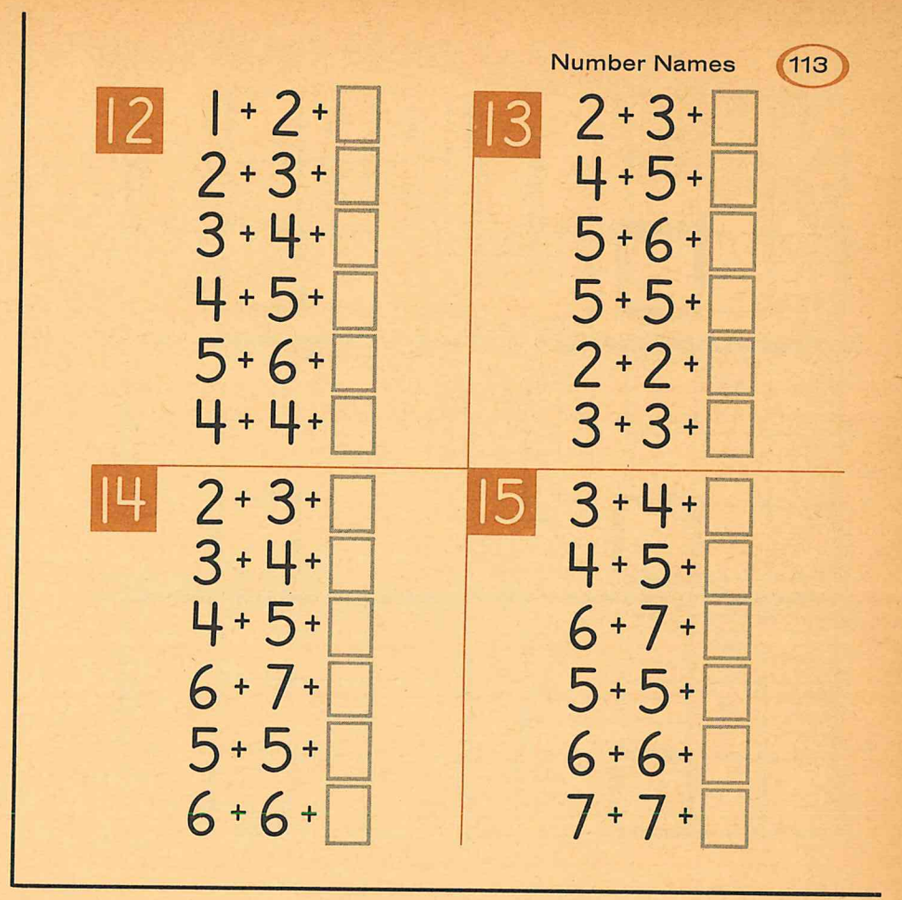
In each of the boxes you will see a set of unfinished number names. Complete each one so that it is another name for the number at the top of the box. Put your answer in the empty frame. Demonstrate this on the chalkboard. **An empty frame tells us a numeral is missing.**

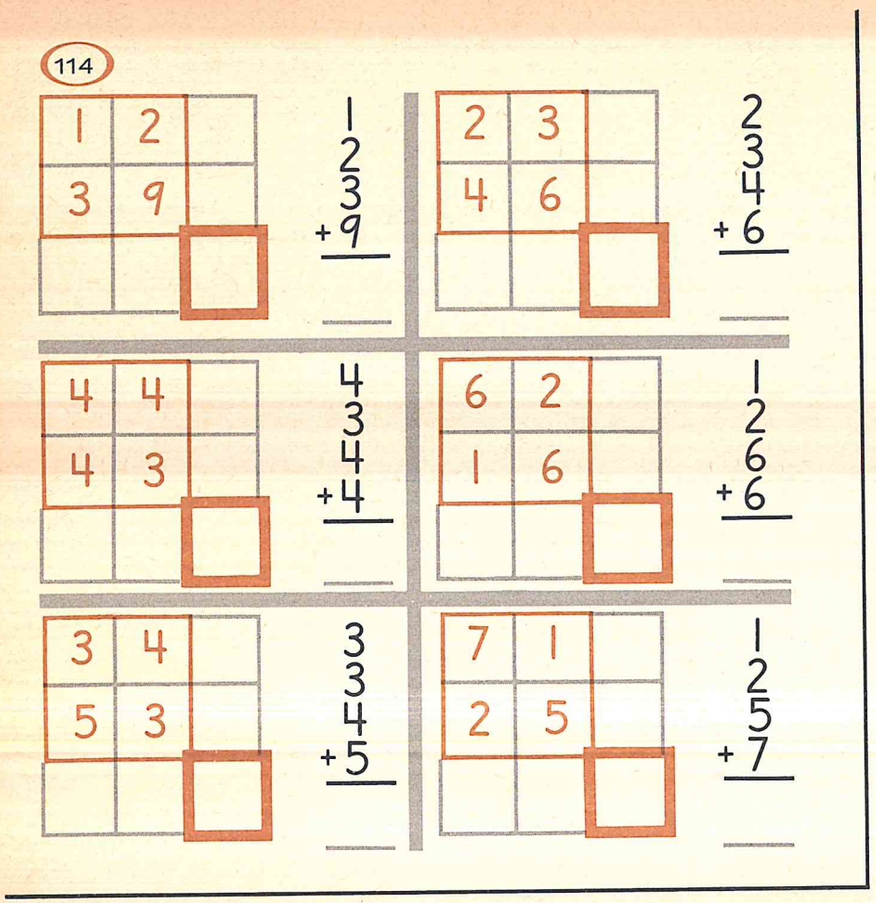
Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **Write the numeral 15 at the top of the page. Write as many names for 15 as you can. Use either two or three numerals with addition—for example, 9 + 6 = 15 or 3 + 6 + 6 = 15.**

Have pupils check each other's papers.





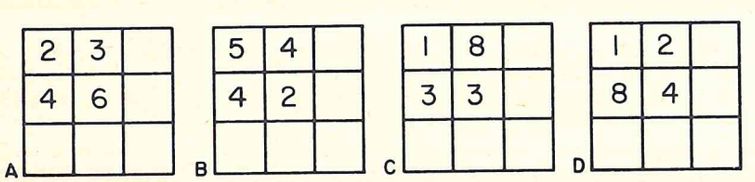
114

Purpose

To extend understanding of the grouping property in addition.

Developmental Activity

Put the number square A on the chalkboard. Have a pupil work it. Put squares B, C, and D on the chalkboard. Call on other children to work them.



Next make column addition examples using the set of four numerals from each number square:

2	5	1	1
3	4	8	2
4	4	3	4
+6	+2	+3	+8

Does the order in which we add the numbers make any difference in the answer? Keep generalizations in the pupils' own words.

Procedure

Open your books to page 114.

These examples are just like the ones we have been doing. Go ahead and work them. Raise your hand if you have a question.

Circulate and give help as needed. A follow-up discussion of this page may be very valuable. **Who noticed anything interesting or unusual about these examples?** [doubles in several examples] Discuss.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the pupils draw four number squares. Let them put in their own numerals. Evaluate the results with the class.

115

Purpose

To test the addition and subtraction facts in 13, 14, and 15.

Materials

A set of 15 counters for each pupil.

Developmental Activity

Today we are going to use two kinds of frames for our answers. Look at this example: $7 + 7 = \square$. What shape is this frame? [square] **What about this example: $6 + 6 = \diamond$? What shape is the frame?** [diamond] **What does an empty frame mean?** [A numeral is missing.]

Procedure

Open your books to page 115.

Write the answer to each example in the frame.

What is the top part of the page? [addition] **What is the bottom part of the page?** [subtraction]

Check your work with your counters.

Make an addition scattergram. Record the errors for each pupil. If a particular example or group of examples is missed by a sizable number of pupils, reteach the combinations. Have pupils make a list of the examples they missed. Then have them practice these combinations with their counters.

NAME	13						14					15			
	4+9	5+8	6+7	7+6	8+5	9+4	5+9	6+8	7+7	8+6	9+5	6+9	7+8	8+7	9+6

Record the errors in subtraction on the subtraction scattergram. Reteach facts which many children may have missed. Have pupils make a list of the examples they worked incorrectly. Have them practice these with their counters.

NAME	13						14					15			
	13−4	13−5	13−6	13−7	13−8	13−9	14−5	14−6	14−7	14−8	14−9	15−6	15−7	15−8	15−9

4+9=□	9+5=□	6+7=□
7+7=□	7+6=□	5+9=□
8+5=□	8+7=□	7+8=□
6+9=□	5+8=□	9+4=□
8+6=□	9+6=□	6+8=□
14−7=◇	13−6=□	15−8=◇
13−4=◇	15−7=□	13−5=◇
15−9=◇	14−5=□	14−9=◇
14−8=◇	13−9=□	15−6=◇
13−8=◇	14−6=□	13−7=◇

116 Diary

April 1 Signs of spring are everywhere.
April 2 Mr. Robert mowed the grass.
April 3 George saw a bluebird.
April 4-11 We watched lima beans sprout.
April 12 Gary saw a big, fat toad.
April 13-21 No school. Vacation fun.
April 22 Bill brought in some tadpoles.
April 23 Louise brought lilacs to school.
April 24 Our teacher found some pussywillows.
April 25 Seven girls have new jump ropes.
April 26 Ann brought some tulips.
April 27 It rained all night.
April 28 We saw a rainbow.
April 29 There were worms on the walk this morning.
April 30 Today is the last day of the month.
We made May baskets.
Tomorrow is the first day of May.

116

Purpose

To have children become aware that the days in each month follow in orderly sequence. To review the names of the months.

Vocabulary

January, February, March, April, May, June, July, August, September, October, November, December, log, diary.

Materials

Large commercial calendar, tagboard or butcher paper for making a large group chart to be illustrated by the children, materials for making individual booklets.

This lesson is best presented at the beginning of a month.

Developmental Activity

Does anyone know how many days there are in a year? [365] **These 365 days are grouped into months. How many months are there?**

Some of the months have 30 days; some have 31 days. February is special in its number of days. How? An easy way for the children to remember how many days there are in each month is to learn one of the versions of this rhyme:

Thirty days have September,
April, June, and November.
All the rest have thirty-one,
Save February which alone
Has twenty-eight in its design,
'Til leap year makes it twenty-nine.

What month is it now? How many days are in it? Have the children verify the number of days by checking a large commercial calendar.

Discuss the month. Include the following in your discussion: special events in the month, children's birthdays, and seasonal activities which take place in it. **You might say that** (name of month) **is a special month. If we look, smell, listen, feel, and, yes, even taste, we can find out why.**

Tell the children that many older children and grownups keep diaries or logs of the things that happen each day.

Procedure

Now let us open our books to page 116 and see the things that have happened to some other children during the month of April. Help with proper names if needed.

Extended Activity

Would you like to keep a record of what happens this month? Perhaps we can write a line a day. What do we call this? I can do the writing on this large piece of paper and you may draw pictures for it. Perhaps some of you will wish to make a copy of our log. Some of you may wish to make a log of your own.

This lesson may be repeated for other months. Day-by-day events in science provide a good diary-keeping situation.

117

Purpose

To extend the children's knowledge of the calendar. To count time by days and weeks on a calendar. To use the calendar as an aid in solving problems.

(Continued on next page.)

(Continued from page 116.)

Vocabulary

Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, first, second, third, fourth, fifth, sixth, seventh, weeks, days.

Materials

To set a hen in the classroom, you will need: a box; a setting of 12 to 15 fertile eggs; a brood hen; clean straw or sawdust; pans for food, water, and gravel.

A large copy of the calendar in the book drawn on the board.

Developmental Activity

This lesson is best presented as a small-group activity.

If possible, the children should have the experience of setting a hen, caring for her, and watching the baby chicks emerge from their shells. If the children can have this firsthand experience, page 117 will have added meaning for them. If setting a hen is not possible, supply the background—either from a book, a film, your own experience, or that of a resource person. Be certain that the children understand what is meant by "setting a hen" before working the page.

Write the names of days of the week in sequence on the chalkboard. Have the children read them. Repeat this. Then write the capital letters: S, M, T, W, T, F, S on the chalkboard. Ask what these capital letters would stand for on a calendar. Point to each letter in sequence and have the children tell what day of the week it represents. Repeat this by pointing to the letters on the chalkboard calendar.

Say the ordinals from first through thirty-first. Point to each numeral on the chalkboard calendar as you say the ordinal for it. **I will say each of these numbers again. Repeat each number after me.** Again, point to the numerals on the calendar.

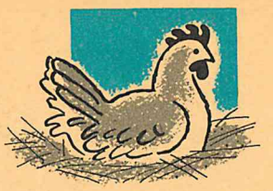
Have a child point to a week on the chalkboard calendar. **Sometimes when we talk about a week, we mean the 7 days which make up a row on the calendar.** (Point to another week.)

Sometimes when we talk about a week, we mean something a little different. If you take out a library book on a Tuesday, and the librarian tells you you may keep it for a week, you will have to return it on the next Tuesday. Demonstrate this on the calendar. Have the children count this out as you point.

Or perhaps Mother tells you on Friday that it is exactly one week until your birthday. On what day is your birthday? Have a child show this on the chalkboard calendar.

Use other illustrations to make this meaning of "week" clear.

Then have them count off 2 weeks and 3 weeks on the calendar. Do this several times.



S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

A It takes three weeks for baby chicks to hatch. How many days is that? _____

B If the class put eggs under the hen on the third (3), on what day will the chicks hatch? _____

C If the hen had been set on the eggs on the first, on what day would the chicks have hatched? _____

D If the hen had been set on the seventh (7), when would the chicks have hatched? _____

E If the hen had been set on the tenth (10), when would the chicks have hatched?

_____

Procedure

Open your books to page 117. Discuss the page, its title, etc.

Let's read problem A under the calendar. What does it tell you? What does it ask? How can we find the answer? Write it.

Have problem B read. **What does it tell you? What does it ask you? How long does it take for chicks to hatch? What can we do to find out on what day the chicks will hatch? Write the answer.** Work the entire page in a similar manner.

If you are working with a fast group, let them work the last 2 problems without help.

Extended Activity

Have the children use the calendar on page 117 to answer the following questions:

What day of the week is the third? What day of the week is the twenty-fourth?

What two days of the week begin with T? What two days begin with S?

On a calendar, what does M stand for? What does W stand for? What does F stand for?

118 Books About Ways We Travel

Cars					
Buses					
Trains					
Boats					
Jets					
Rockets					

118

Purpose

To help children develop a simple pictograph.

Vocabulary

Pictograph, graph.

Materials

Crayons.

Developmental Activity

Transportation is an interest area often developed in the second grade. Children should be encouraged to read books about ways of travel. They should be trained to locate such books within the school or classroom library.

List on the chalkboard:

Ways We Travel

Cars Buses Trains Boats Jets Rockets

Encourage a group of children or a committee to locate all the books they can relating to each of these methods of transportation.

Tallying could be used as children locate books and decide with which form of transportation they deal. When the research is completed, the tally marks could be totaled and the number of books in each category could be recorded. Books about each means of travel could also be grouped together for checking.

Procedure

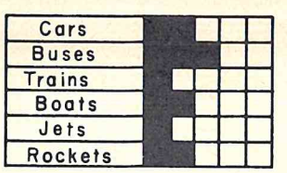
Open your books to page 118. What is the title of this page? We will use this page to make a record of the books we have about different ways of traveling.

Point to the words listed in a column. Who can read the first word? [cars] **How many books do we have about cars?** Write on the chalkboard "cars" and the number of books about cars the children have collected. Then have the children draw in each square one car for each book about cars. If there are more than six such books, tell the children how the cars should be arranged in the boxes. You might also have the children write the total number of books about cars in the margin next to the last box.

Have the children read each of the words in the column. Write each of these words on the chalkboard together with the appropriate number of books. Tell the children to use the information on the board to find out how many buses, trains, etc., should be drawn on the pictograph. Suggest that they draw a locomotive for each book about trains.

Extended Activity

You may vary this lesson by using the information gathered about books on transportation to develop a simple bar graph. Each square may be colored to represent a book on hand for any given category. Your bar graph may be made like the one shown here. It represents two books on cars, three on buses, etc.



Pictographs may be made several times during the school year. They may relate to class attendance, library books read, science and social studies projects, etc.

Such class pictograph-making experiences are of great value in increasing the children's knowledge of pictographs.

119

Purpose

To give children practice in reading and working story problems.

Vocabulary

Which is more, how many more, all together.

Materials

Blocks, sticks, or pieces of chalk may be used to symbolize the books; or the books themselves may be used.

Developmental Activity

After the children have developed their own pictograph, the information recorded on it may be used to make up story problems.

Procedure

Open your books to page 119.

These are story problems about our books. Read the first sentence in problem 1. How can we find the information to finish this sentence? [by looking at our pictograph] **What numeral shall we write to tell how many books about cars we have?**

Read the rest of problem 1 silently. Can you write in each answer? When you have done this, write the number sentence for this problem.

Call on a child to read the completed problem aloud while the other children read over their papers.

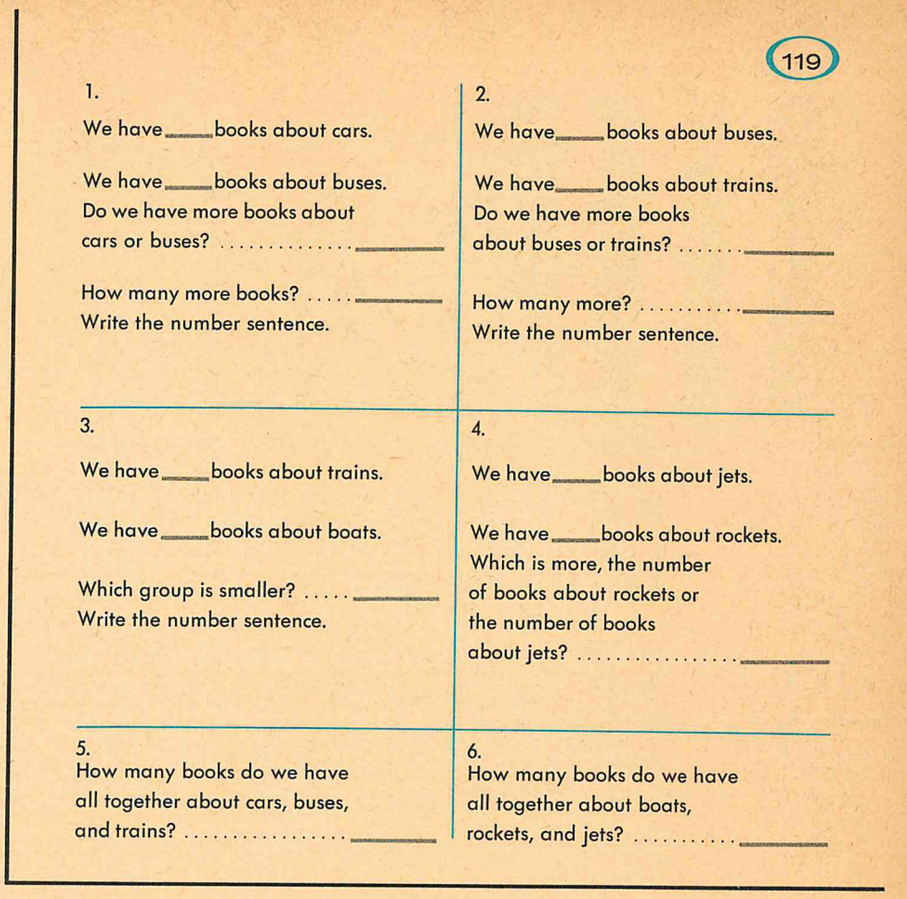
Work the second problem in the same manner if you feel the group needs additional practice. If further practice is not indicated for the children, let them work independently to complete the page.

While the children are doing this page, circulate and check their work. Give help to those who need it.

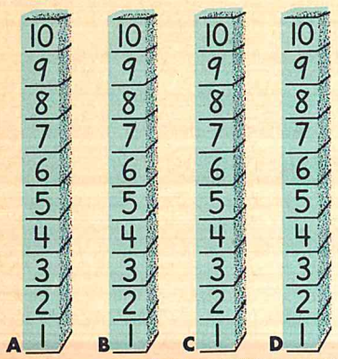
Extended Activity

Much problem-solving power may be gained by having children work problems orally. You might make problems from experiences familiar to the children, and use number combinations the children are working with.

If oral problems are presented for a few minutes each day, the children will soon be able to make up story problems for others to solve. Often children will be able to write story problems. This should be encouraged, but not forced.


119
1.
We have ____ books about cars.
We have ____ books about buses.
Do we have more books about cars or buses? .....
How many more books? .....
Write the number sentence.
2.
We have ____ books about buses.
We have ____ books about trains.
Do we have more books about buses or trains? .....
How many more? .....
Write the number sentence.
3.
We have ____ books about trains.
We have ____ books about boats.
Which group is smaller? .....
Write the number sentence.
4.
We have ____ books about jets.
We have ____ books about rockets.
Which is more, the number of books about rockets or the number of books about jets? .....
5.
How many books do we have all together about cars, buses, and trains? .....
6.
How many books do we have all together about boats, rockets, and jets? .....

120



How many blocks are in tower A? ____

How many blocks are in tower B? ____

How many blocks are in tower C? ____

How many blocks are in tower D? ____

How many blocks in all? ____

Look at the blocks to answer the questions.

1 ten 10 + 1 ten + 10 ____ tens or ____	1 ten 10 + 2 tens + 20 ____ tens or ____	2 tens 20 + 2 tens + 20 ____ tens or ____
2 tens 20 + 1 ten + 10 ____ tens or ____	3 tens 30 + 1 ten + 10 ____ tens or ____	1 ten 10 + 3 tens + 30 ____ tens or ____

120

Purpose

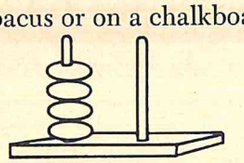
To introduce two-column addition.

Materials

A chalkboard 100 number line, an abacus.

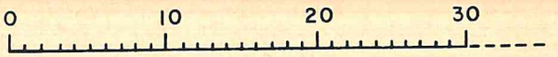
Developmental Activity

On either a large abacus or on a chalkboard model, put 40.



Who can read the number on this abacus? [4 tens or 40] **How many ones are shown?** [none or zero] **What is the long way to read 40?** _____ [4 tens and no ones] Use a similar procedure for 30, 60, 70, and 90.

Then find each of the above numbers as points on a chalkboard 100 number line.



Count by 10's on the line to 30, 60, 70, and 90. For example—30 is 10—20—30 or 3 tens.

Use 20, 40, 30, and then 50 as starting points. Have pupils show how much ten more than each of these numbers is on the number line. **20 and 10 is_____.** [30]

Procedure

Open your books to page 120.

What do the sentences by the blocks say? Read them with the group. **Write the answer to each question.** Pause.

Now look at the bottom part of the page. The first example is (put it on the chalkboard):

1 ten	10
+ 1 ten	+ 10
2 tens	20

Is the numeral 10 another name for 1 ten? Point to 10 and 1 ten. [yes]

What is the answer to the next example? [3 tens or 30] **Go ahead and work the rest of the examples. Write carefully. If you have trouble, look at the blocks for help.**

Extended Activity

Pass out 6″ x 9″ ruled newsprint.

1. Count by 10's to 100. Write the numerals down the paper.

2. Count by 5's to 100. Write the numerals on the other side of the paper.

121

Purpose

To extend two-column addition.

Materials

An abacus, a chalkboard number line, 25 pennies.

Developmental Activity

Let's count by 10's to 100.

Then have children give oral responses to a fast drill exercise. Write 30 on the chalkboard. Point to it. **Read 30 the long way.** [3 tens and no ones] Repeat with 20, 50, 70, 40, 80, 60, and 90.

Put a cent sign on the chalkboard. **Who can read this?** [cent, cents, cent sign] **What does it mean?** Discuss. **Let's use the cent sign.** Put 4¢ on the chalkboard. Have the group read it. [4 cents] Repeat with 3¢, 7¢, 15¢, 40¢, 12¢, and 90¢. Make up more examples if needed.

Put 25¢ in pennies on the table. Put 4 pennies in a row and 1 penny next to them. Write on the chalkboard:

$$\begin{array}{r} 4¢ \\ +\ 1¢ \\ \hline ¢ \end{array}$$

When we add cents, we use the cent sign to show that we are adding cents.

Sometimes in problems we will be adding perhaps apples, boats, or cars. We may write "apple," "boat," or "car" next to each numeral to show that we are adding apples, boats, or cars. Illustrate this on the chalkboard.

When we add 3 tens and 1 ten, the words "tens" and "ten" show us what we are adding. But we can write 3 tens as a numeral. What numeral? [30] **We can write 1 ten as a numeral. What numeral?** [10] **Which is the faster way of writing it, 3 tens or 30?** [30]

Put several examples on the chalkboard and have the group work them.

$$\begin{array}{r} 3¢ \\ +\ 1¢ \\ \hline ¢ \end{array} \qquad \begin{array}{r} 3 \text{ tens} \\ +\ 1 \text{ ten} \\ \hline \end{array} \qquad \begin{array}{r} 30 \\ +\ 10 \\ \hline \end{array} \qquad \begin{array}{r} 5¢ \\ +\ 2¢ \\ \hline ¢ \end{array} \qquad \begin{array}{r} 5 \text{ tens} \\ +\ 2 \text{ tens} \\ \hline \end{array} \qquad \begin{array}{r} 50 \\ +\ 20 \\ \hline \end{array}$$

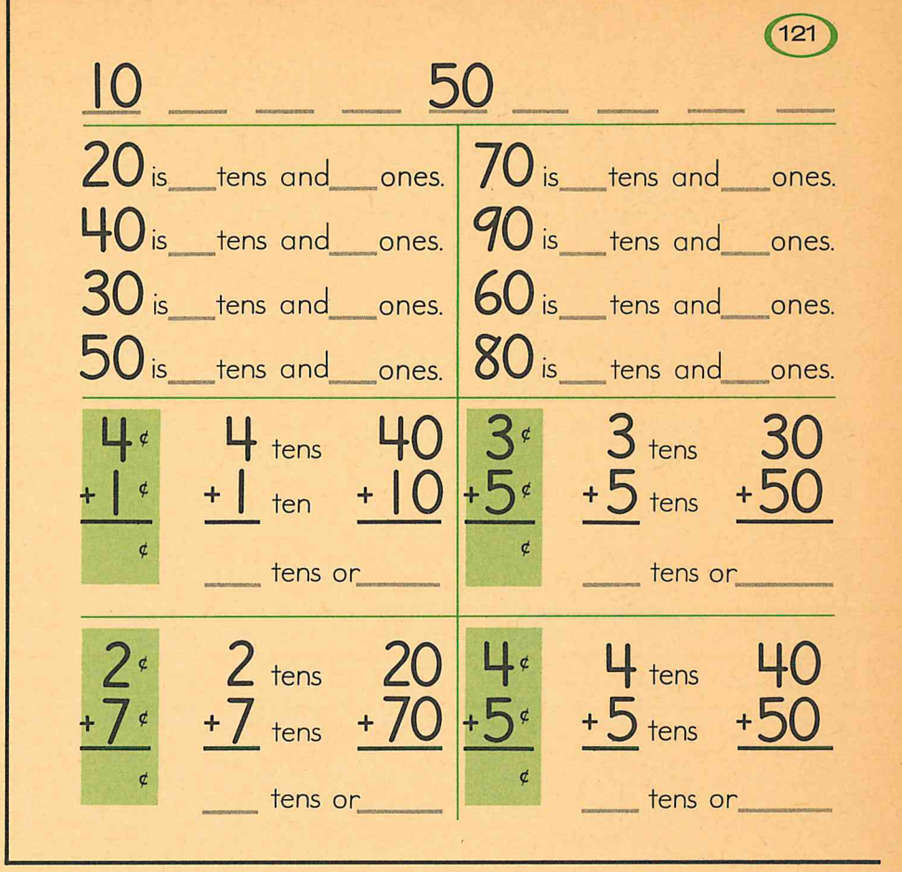
tens or tens or

Have the group work more examples if necessary.

Procedure

Open your books to page 121.

At the top of the page, you are to count by 10's. Write the answers.


121
10 ___ ___ ___ 50 ___ ___ ___ ___
20 is ___ tens and ___ ones.
40 is ___ tens and ___ ones.
30 is ___ tens and ___ ones.
50 is ___ tens and ___ ones.
70 is ___ tens and ___ ones.
90 is ___ tens and ___ ones.
60 is ___ tens and ___ ones.
80 is ___ tens and ___ ones.
4¢ +1¢ ¢
4 tens +1 ten ___ tens or ___
40 +10
3¢ +5¢ ¢
3 tens +5 tens ___ tens or ___
30 +50
2¢ +7¢ ¢
2 tens +7 tens ___ tens or ___
20 +70
4¢ +5¢ ¢
4 tens +5 tens ___ tens or ___
40 +50

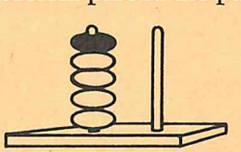
The next part is easy. Twenty is how many tens? [2] **And how many ones?** [no ones] **Write the answers.**

The bottom part of the page is just like the examples we have been working. Let's see if you can get them all correct.

Circulate and give help as needed.

Extended Activity

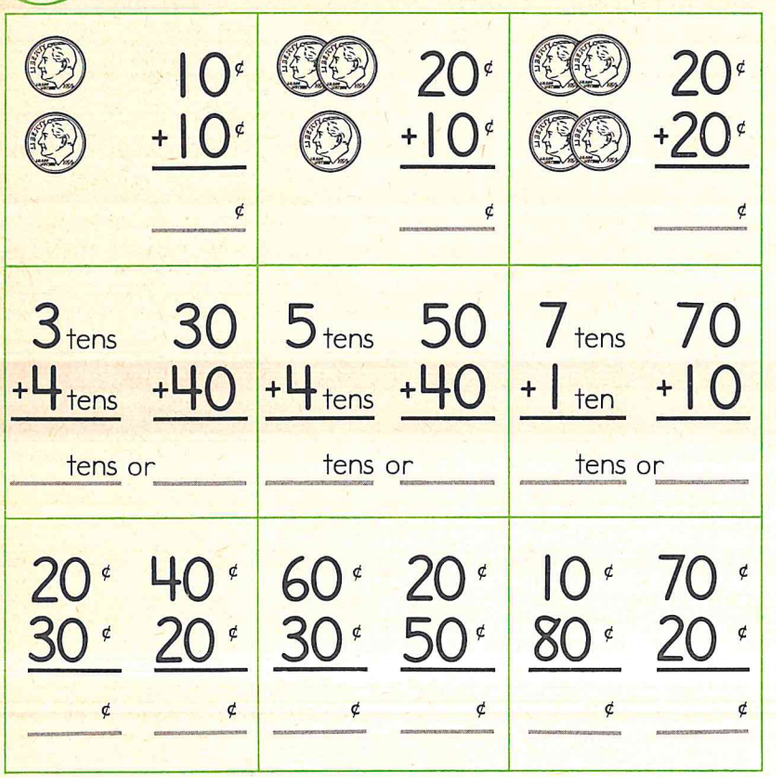
Have the children make an abacus picture for each example on the bottom part of the page—for example:



$$\begin{array}{r} 4 \text{ tens} \\ +\ 1 \text{ ten} \\ \hline \end{array}$$

Have them draw the beads representing one addend in black, and the beads representing the other addend in red. Demonstrate this on the chalkboard.

122



122

Purpose

To extend two-column addition.

Materials

10 dimes.

Developmental Activity

Work in small groups. Put the dimes on the table. Hold up 2 of them. Turn to the chalkboard. Write:

$$\begin{array}{r} 10¢ \\ +\ 10¢ \\ \hline 20¢ \end{array}$$

I'm going to show some dimes. See if you can write the story. Show 2 dimes and 1 dime. Have a pupil write on the chalkboard:

$$\begin{array}{r} 20¢ \\ +\ 10¢ \\ \hline 30¢ \end{array}$$

Repeat for 3 dimes + 1 dime, 4 dimes + 2 dimes, 5 dimes + 3 dimes, etc., until all the children have had a turn and until everyone has grasped the idea.

Procedure

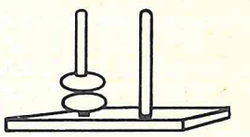
Open your books to page 122. These examples are easy. We have been working examples just like these on the chalkboard. Raise your hand if you need help. Write neatly. Work the whole page.

Circulate and help as needed.

Extended Activity

Have the children make an abacus picture for each of the examples on this page. Demonstrate this on the chalkboard:

$$\begin{array}{r} 10 \\ +\ 10 \\ \hline \end{array}$$



123

Purpose

To help children learn what is meant by rounding numbers.

Vocabulary

Round numbers, approximation, weight, weighs, scales, about.

Materials

Scales for weighing children.

> In this lesson, all weights will be rounded to the nearest ten.

Developmental Activity

Weigh several children or get their weights from the school nurse's records. Record these weights on the chalkboard. Use them to teach the children how to round to the nearest ten point. If a child weighs 48 pounds, he weighs about 50 pounds. In round numbers he weighs 50 pounds.

Lead the children to realize that most adults weigh over 100 pounds. If Mr. Jones weighs 138 pounds, in round numbers we say he weighs 140 pounds. Mr. Smith weighs 142 pounds; in round numbers he weighs 140 pounds.

Have the children express the following weights as round numbers: 147 pounds, 158 pounds, 113 pounds, 52 pounds.

When most of the children understand rounding, have them turn to page 123.

Procedure

Open your books to page 123.

Have a child read the first problem. **What does it tell you? What must we find out? Sixty-eight pounds is about how many pounds? Where should we write the 70? Write it.**

Work problem 2 in a similar manner.

Have the children read problem 3 silently. **Would we work this problem the same way we have worked the other problems? How many pounds does the baby weigh?** [$9\frac{1}{2}$] **Is $9\frac{1}{2}$ more than 9 pounds? Nine pounds is almost how many pounds?** [10] **Write the 10 on the line.**

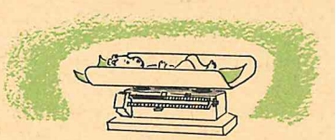
Work problem 4. Use a procedure like that used for problems 1 and 2. Check children's understanding of 162 being rounded to 160.

Extended Activity

Near the end of the year, bring in a bathroom scales. Weigh several children and have "rounding to" examples made with these weights.

1. Brother weighs 68 pounds.
This means
he weighs about _____ pounds.

2. Big sister weighs 99 pounds.
This means
she weighs about _____ pounds.

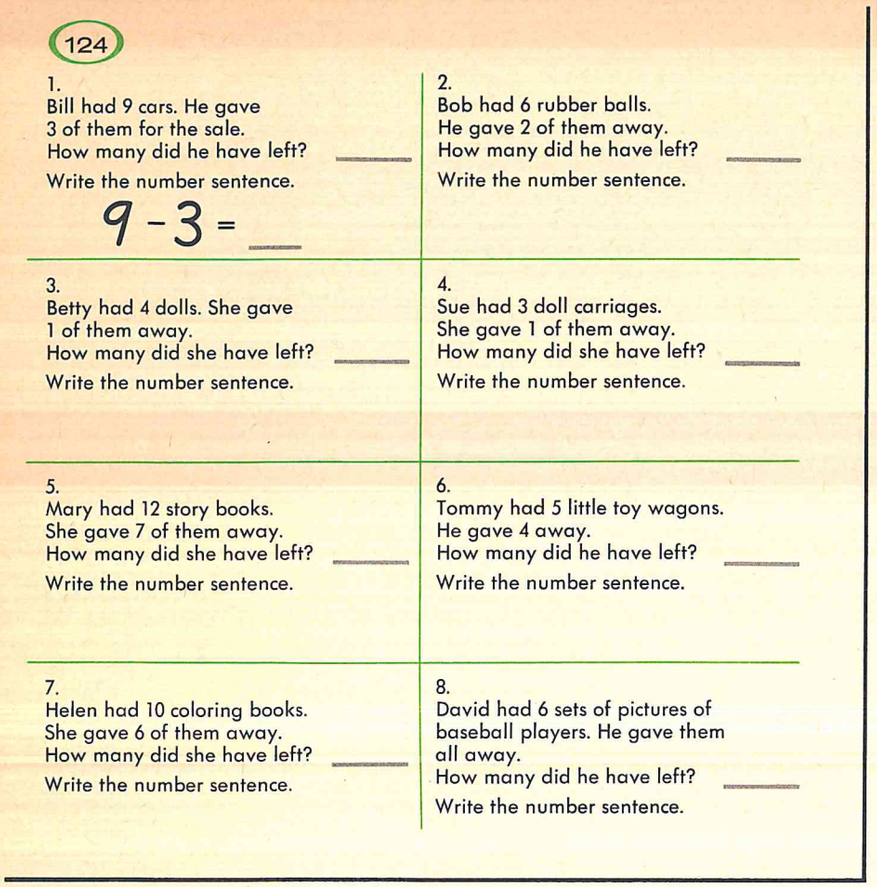


3. The new baby weighs $9\frac{1}{2}$ pounds.
This means
she weighs almost _____ pounds.

4. Father weighs 162 pounds.
In round numbers
that is _____ pounds.

5. Mother weighs 128 pounds.
In round numbers
that is _____ pounds.

6. Little sister weighs 27 pounds.
In round numbers
she weighs _____ pounds.



124

1. Bill had 9 cars. He gave 3 of them for the sale. How many did he have left? ____
Write the number sentence.
9 - 3 = ____

2. Bob had 6 rubber balls. He gave 2 of them away. How many did he have left? ____
Write the number sentence.

3. Betty had 4 dolls. She gave 1 of them away. How many did she have left? ____
Write the number sentence.

4. Sue had 3 doll carriages. She gave 1 of them away. How many did she have left? ____
Write the number sentence.

5. Mary had 12 story books. She gave 7 of them away. How many did she have left? ____
Write the number sentence.

6. Tommy had 5 little toy wagons. He gave 4 away. How many did he have left? ____
Write the number sentence.

7. Helen had 10 coloring books. She gave 6 of them away. How many did she have left? ____
Write the number sentence.

8. David had 6 sets of pictures of baseball players. He gave them all away. How many did he have left? ____
Write the number sentence.

124

Purpose

To give additional practice in solving story problems. To write the number sentence to express the number relationship in each problem.

Materials

Pictures of items mentioned in the problems or sketches of the items on the chalkboard.

Vocabulary

How many, number sentence, have left.

Developmental Activity

Present any words on the page that may be difficult.

Show pictures of the articles mentioned in several of the problems or sketch these on the chalkboard.

Review how to write a number sentence if necessary.

Procedure

Open your books to page 124.

Work this as a small-group activity.

Look at problem number 1. Who will read it? What does this problem tell you? Draw all pertinent information from the children. **What does it ask you? How can we find the answer?** If children have difficulty, draw 9 cars on the board. Have someone circle those that were given for the sale. **How many are left? Finish the number sentence.**

Work problem 2 the same way; problem 3, also if necessary.

Let the children complete the page themselves. Give help to those who have difficulties in reading and to those who find the problem-solving hard.

Extended Activity

Encourage children to bring in pictures of toys, animals, cars, children, etc., from magazines. Make a file of these. When an adequate collection has been accumulated, use the pictures for verbal story problems.

125 126

Purpose

To use liquid and dry measurements in a bread-baking experience. To understand that it is possible to convert a large unit, i.e., quart, to smaller units, i.e., pints and to convert small units to larger ones. To learn the relationship between half pint, pint, quart, half gallon, and gallon. To relate these learnings to functional uses in everyday living.

The study of liquid and dry measurement will be more meaningful for the children if they can engage in some experiences which use measurements and equivalents.

Help the children to see that measurement includes determining how often a given unit, such as a pint, is included in some larger unit, such as a quart. The children should learn how to change pints to quarts and quarts to pints by experimenting.

Vocabulary

Ingredient, measuring cup, pint (pt.), quart (qt.), gallon (gal.), half gallon, measure, container, accurately, carton, bottle, dozen (doz.), pair, twelve, full, half full, teaspoon, tablespoon, lukewarm, half empty, almost full, exactly, empty, and half dozen.

Materials

Ingredients in recipe. Measuring cups, spoons, bowls. Containers—as many different containers as possible, such as:

Quart—milk carton, milk bottle, fruit jar, thermos bottle.

Pint—half-and-half carton, pint milk bottle, fruit jar, thermos bottle.

Half pint—milk carton, measuring cup, 8 oz. glass, thermos bottle.

Half gallon—jar, jug.

Gallon—jar, jug.

Assorted sizes of ice cream containers.

Labels for containers, water, a funnel.

Developmental Activity

If you have not baked bread before, it would be well to consult a cookbook for a more detailed recipe, which includes the finer points of kneading.

Tell the children the meaning of ingredient. Discuss with the children the need for reading a recipe carefully, measuring each ingredient accurately, and paying close attention to how hot the oven must be and the length of time needed for baking.

Recipe for Making Bread

Mix together in a large round bowl:
- 2¼ cups of lukewarm water
- 3 tablespoons of sugar
- 1 tablespoon of salt.

Crumble 2 cakes of yeast into the mixture.
Stir until the yeast is dissolved.
Stir in 2 tablespoons of melted shortening.
Mix in 3½ cups of flour.
Mix first with a spoon, then with your hand.
Add 3½ more cups of flour.
Knead the dough.
Let it rise.
Shape it into 2 loaves. Place them in greased pans.
Let the loaves rise.
Bake at 425° for 25 to 30 minutes.

Procedure

Open your books to page 125. Have the recipe read aloud.

Have the children read and discuss each of the equivalents on page 126. Emphasize the cups-pint, cups-quart, and teaspoons-tablespoon relationships. Have the title read. **Do you think this is a good title for this page? Why?**

Then have the children silently reread the recipe. **How many loaves of bread will we make with this recipe?** [2] **Is that enough for our class?** Discuss. **How can we find out how much of each ingredient we will need to make** (number class will bake) **loaves of bread?** With your help have the children estimate how much flour, sugar, shortening, etc., will be needed to make the number of loaves of bread you have decided upon.

The class may go to a grocery to buy the ingredients, or you and the children may bring them in.

This recipe calls for cakes of yeast. If these are not available, use an equivalent amount of compressed yeast.

(Continued on next page.)

126

When Baking Bread It Helps To Know
3 teaspoons = 1 tablespoon
Flour
1 pound of flour = 4 cups
4 tablespoons = 1/4 cup
Sugar
1 pound of sugar = 2 1/4 cups
2 cups = 1 pint
4 cups = 1 quart
1/4 pound of shortening = 1/2 cup

(Continued from page 125.)

Ingredients and measuring cups, spoons, and bowls may be arranged on a table. Discuss the use of the measuring devices.

It is probably best that you do the measuring, unless there are several able children you can entrust with it. Have children take turns mixing the ingredients and kneading the dough. Make arrangements in advance for the school cafeteria cook or a friendly neighborhood woman to bake the bread. **What must we be sure to tell Mrs. (Miss) _____?** [how hot the oven must be, how long the bread should be baked] Eating the bread with butter or sharing it with special friends climaxes this experience.

Following the bread-baking experience, perhaps the day after, the children are ready for more mathematical understandings of liquid or dry measurements through actual experimentation.

Ask the children to bring in a variety of empty containers. Display them in a prominent place. Group them according to size. Discuss these containers and what might be bought in each.

Have one or more sets of standard size containers available —each labeled with its capacity. Let the children use these to determine the capacity of the other containers. As its capacity is determined, each container should be placed in an area set aside for containers of that size. Prepare a label for each area with the appropriate measurement and its abbreviation.

Have the children use water. Let them fill a quart bottle, for instance. Then have them pour the water into a container they judge to be a quart. **Is it a quart?**

Then work in small groups to have the children discover the relationships between a quart and a pint, a pint and half pint, gallon and quart, cup and quart.

Point out causes of error, such as spilling and incorrect filling, when they occur.

Use flannel board cutouts to show equivalents. Write generalizations on the chalkboard:

We Found Out That

1 quart = 4 cups	2 cups = 1 pint
1 quart = 2 pints	2 pints = 1 quart
1 quart = 4 half pints	4 quarts = 1 gallon

Extended Activity

Relate measurements to a study of milk and the dairy.

Make cocoa, ice cream, or butter, or have some other cooking experience.

Most recipes call for the use of eggs. This affords an opportunity to include a study of things bought by the dozen. Make a list. Ask the children to bring in pictures to illustrate the list. After the list has been posted, play a riddle game. For example—"I go on a picnic. I buy 3 things sold by the dozen. What are they?"

Add egg cartons to the play shelf or develop a "milk and egg" store. Engage in dramatic play and encourage children who need further help to play.

127

Purpose

To introduce three-addend column addition of money through a story situation.

Vocabulary

Record, total.

Materials

Money (nickels and dimes).

Developmental Activity

Copy the examples in the book (in scrambled order) on the chalkboard. Have several children count with real coins to find the answers.

Explain the meaning of total. **If we add 5 and 2 and 3** (write 5, 2, 3 on the chalkboard in a column) **the total is 10.** Give several illustrations.

Procedure

Open your books to page 127.

Talk about selling cold drinks. **When do cold drinks taste best, in summer or winter?**

What does the sign in the picture read? Put an X on the sign.

Find the pitcher of fruit drink. Draw a ring around it.

Count the cups. Put a numeral on each as you count it.

Read the names of days of the week at the bottom of the page. What days are missing?

Now ask everyone to read the page silently. When each child has finished reading, he may look up. If anyone needs help with the new words, he may ask for it. Through questioning find out whether the children understand what they are supposed to do.

Let the children do the first four examples by themselves. Observe their work. Be certain they are including cent signs.

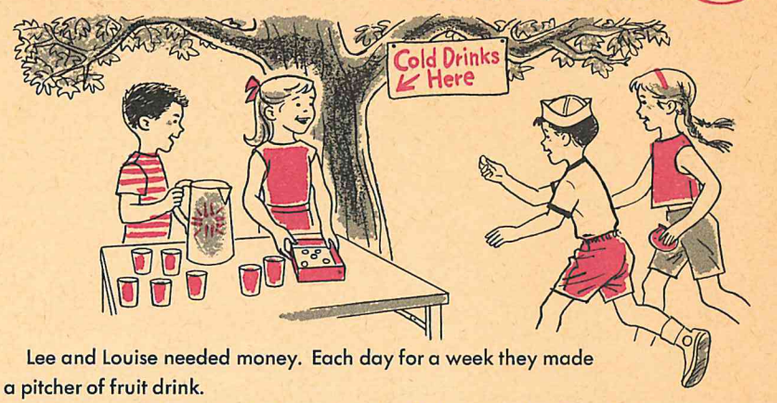
Then work the last example with the group. Have the children find the answer by counting coins or by oral addition.

Extended Activity

Write each day's total on the chalkboard. Under your guidance see how many children can total the week's sales.

20¢
25¢
30¢
40¢
30¢

The answer may be left as 145¢.



Lee and Louise needed money. Each day for a week they made a pitcher of fruit drink.

They put a table out under the tree and sold drinks to their friends.

Each day they kept a record of the money they took in.

Can you add to find out how much money they had at the end of each day?

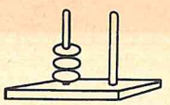
Monday	Tuesday	Wednesday	Thursday	Friday
5¢	5¢	10¢	20¢	15¢
5¢	10¢	10¢	10¢	10¢
5¢	10¢	10¢	10¢	5¢
5¢				

128

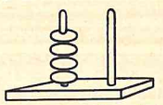
Adding Tens and Ones

24 = __ tens and __ ones +31 = __ tens and __ one __ = __ tens and __ ones	57 = __ tens and __ ones +21 = __ tens and __ one __ = __ tens and __ ones
17 = __ ten and __ ones +42 = __ tens and __ ones __ = __ tens and __ ones	35 = __ tens and __ ones +52 = __ tens and __ ones __ = __ tens and __ ones

42	23	24	35	12	53
+21	+62	+14	+43	+47	+23
__	__	__	__	__	__



What number does this represent? [30 or 3 tens] Write 30 = 3 tens on the chalkboard. **If we add 10 more to the 30, how many will we have?** [40] Draw another bead on the abacus:



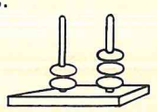
On the chalkboard quickly write the following:

30	50	40
+ 10	+ 20	+ 30

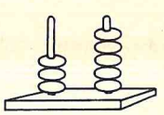
Have pupils go to the board and work them. Point to each example and have it read:

30 = thirty or 3 tens
+ 10 = ten or 1 ten
40 = forty or 4 tens

Now put 23 on an abacus.



Can we add 12 to the 23 on the abacus? How? Pupils will quickly volunteer the solution:



What is the answer? [35 or 3 tens and 5 ones] Quickly put 12 + 23 on the chalkboard. Have a pupil go to the board and work the example. **1 ten and 2 tens are 3 tens. 2 and 3 are 5.**

Write the following examples on the chalkboard:

21	32	12	33	64	42
+ 15	+ 24	+ 14	+ 21	+ 13	+ 35

Have the pupils: (1) Show an abacus picture for each one. (2) Work each one the long way, as tens and ones.

Procedure

Open your books to page 128.

These are just like the examples we have been working. Work the first one. What is the answer? [55] **Write in the answer to each one.**

(Continued on next page.)

128

Purpose

To extend two-place column addition.

Materials

A chalkboard abacus.

None of the examples on this page involves carrying, so it makes no difference whether the tens or the ones are added first. At this stage of development, it is well to continue the left to right progression, adding the tens, then the ones. The transition to the usual order of adding is easy and can be made when the children are aware of the function it serves.

Developmental Activity

Put an abacus picture on the chalkboard.

(Continued from page 128.)

Extended Activity

Pass out 9″ x 12″ paper with 6 abaci on it. (Run this off on a spirit duplicator if possible.) Have the group show each example in the last row of the page on an abacus.

129

Purpose

To extend two-column addition (no regrouping) to three addends.

Materials

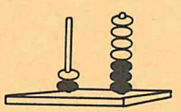
A chalkboard abacus.

Developmental Activity

Write on the chalkboard:

$$\begin{array}{r} 13 \\ +\,14 \\ \hline \end{array}$$

Have the group tell the answer. Let one pupil explain how he worked it, and have another draw an abacus picture to show the answer. Using colored chalk appeals to the pupils and makes it easy to separate the number ideas. Show the 14 with red. Show the 13 with green.



Use a similar procedure for

15	23	45	50	45	60
+ 12	+ 26	+ 30	+ 26	+ 34	+ 37

Now we'll try something new. Who can work this example?

$$\begin{array}{r} 11 \\ 22 \\ +\,34 \\ \hline \end{array}$$

Pupils should have no difficulty with this example. Have a pupil show it on the abacus, using a different color for each addend. Have the following worked the same way:

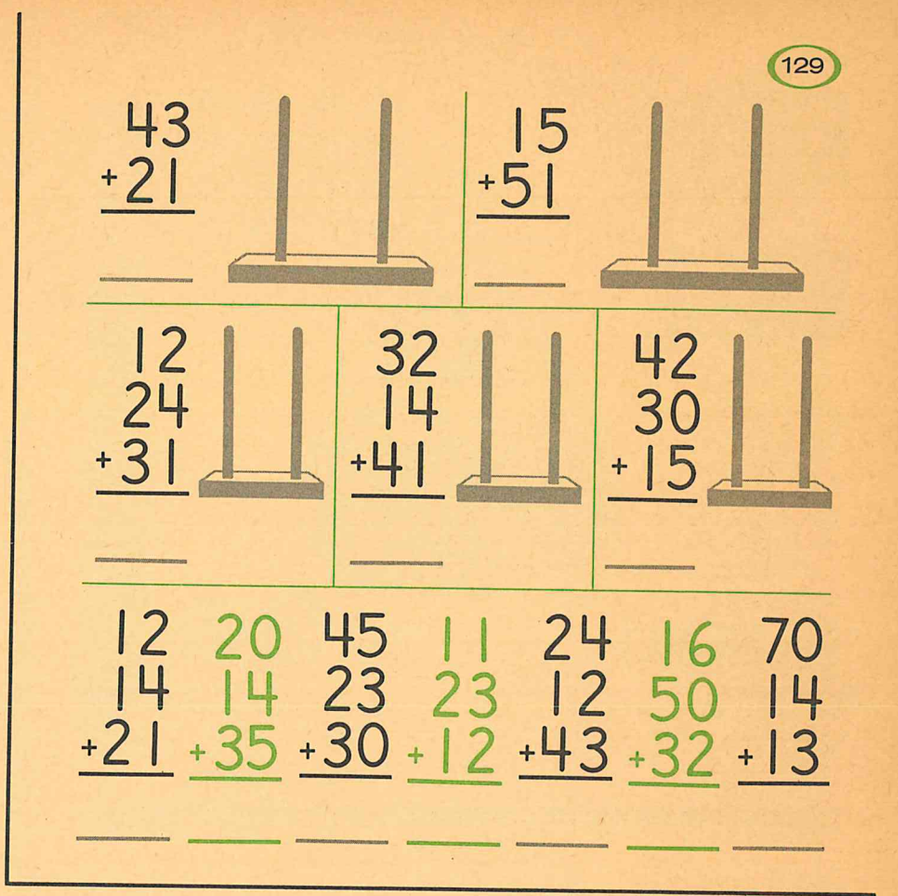
13	24	35	20	15	32
14	20	10	15	21	16
+ 21	+ 32	+ 24	+ 40	+ 32	+ 40

Procedure

Find page 129 in your books.

These examples will be fun! They are just like those we have been working at the chalkboard. What is the answer to the first one? [64] **Use your crayons to show it on the abacus. Go ahead and work the others.**

Circulate and help as needed.

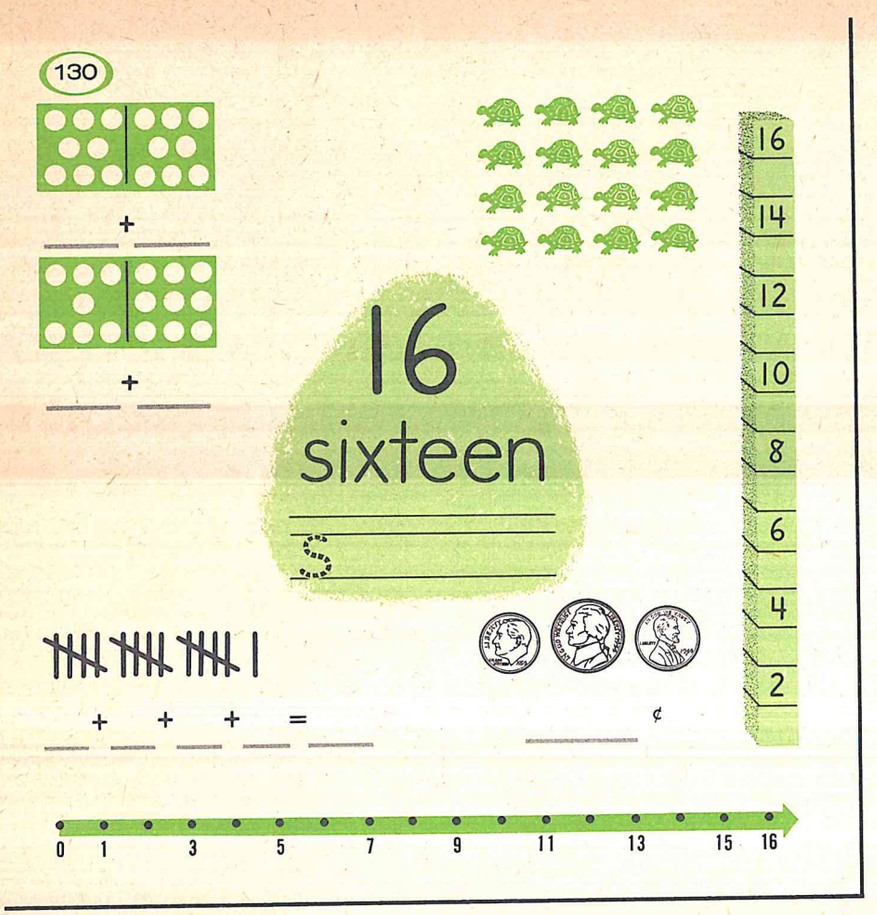


Extended Activity

Pass out 6″ x 9″ ruled newsprint. Put this set of examples on the chalkboard:

40	23	16	18	36	50
17	65	42	70	23	12
+ 41	+ 10	+ 31	+ 11	+ 40	+ 17

Have the group copy and work them.



130

Purpose

To extend understanding of the numeral 16 and the word sixteen. To explore some of the ideas these symbols represent.

Materials

A set of 16 counters for each pupil, a chalkboard number line.

Developmental Activity

Put the numeral 16 on the chalkboard. **What numeral is this? What is the long way to read 16?** [1 ten and 6 ones] **Put 16 counters on the desk in front of you. What number names for 16 can we make with two groups? Each group must have no more than 9 in it.** Have pupils take turns writing the number pairs on the chalkboard:

$8 + 8 = 16$ $7 + 9 = 16$ $9 + 7 = 16$

Have each one shown on the number line.

What other names for 16 can we write? Have the children show each name with their counters. Explore:

$10 + 6 = 16$
$5 + 5 + 6 = 16$
$2 + 2 + 2 + 3 + 4 + 3 = 16$, etc.

When the pupils have demonstrated a good understanding of the idea, go on to Procedure.

Procedure

Draw a ring around the numeral 16 in the center or middle of page 130. Draw a line under the word "sixteen." Then write the word "sixteen" on the line. It is started for you.

Put your finger on the money. What are the coins? [dime, nickel, penny] **What number sentence does the money suggest?** Discuss. **On the line below the money write the numeral that tells how much money there is all together.**

Put your finger on the picture of the number line. Which numerals are missing? [even ones—2, 4, 6 to 14] **Write them in.**

Find the tallies. Where are they on this page? [lower left part] **What number sentence do they suggest? Write it on the lines.**

Find the turtles. How many are there? [16] **How do you know?** [four rows of 4, etc.] **What number sentence do they suggest?**

Point to the dominoes. What number name for 16 does the top domino suggest? [8 + 8] **Write it on the lines. What name for 16 does the bottom domino suggest** [7 + 9] **Write it on the lines.**

Put your finger on the tower of blocks. How many blocks are there? [16] **Which numerals are missing?** [odd] **Write them in.**

Extended Activity

Today we are going to learn a new game with number frames. In our new game we are going to have two empty frames in the same number sentence. Put on the chalkboard: $\square + \diamond = 8$ **How many numerals will we need to write in this number sentence?** [2] **The rule of the game is when the frames are not the same, the numerals written in them are not the same. What numerals can we write in the frames for this number sentence?** [3 and 5, 2 and 6, etc.] Put $\boxed{4} + \diamond = 8$ on the chalkboard. **Why can't we use this answer? After all, 4 and 4 are 8.** Discuss. [Rule—Each different-shaped frame calls for a different number. Only answers that follow this rule are legal.]

What are some other legal answers for $\square + \diamond = 8$?

$\boxed{1} + \diamond = 8$ $\boxed{7} + \diamond = 8$ $\boxed{5} + \diamond = 8$

$\boxed{2} + \diamond = 8$ $\boxed{6} + \diamond = 8$

(Continued on next page.)

(Continued from page 130.)

Continue the game with $\square + \diamond = 9$ and $\diamond + \square = 10$.

Then pass out 6″ x 9″ ruled newsprint. Put $\square + \diamond = 11$ and $\square + \diamond = 12$ on the chalkboard. **Find as many answers to these sentences as you can.**

131

Purpose

To extend understanding of the addition and subtraction relationships in 7, 9, and 16.

Materials

A set of 16 counters for each pupil, a chalkboard number line, a set of 16 toy cars (3″ to 4″ long).

On a piece of 18″ x 24″ oaktag, draw a parking lot (for the toy cars). Make 16 parking spaces. The children may number the parking spaces if they wish.

Developmental Activity

Place 16 counters in a straight row. Separate them into a set of 7 and a set of 9. How many number sentences can we write about these groups? Explore and discuss. Write each sentence on the chalkboard:

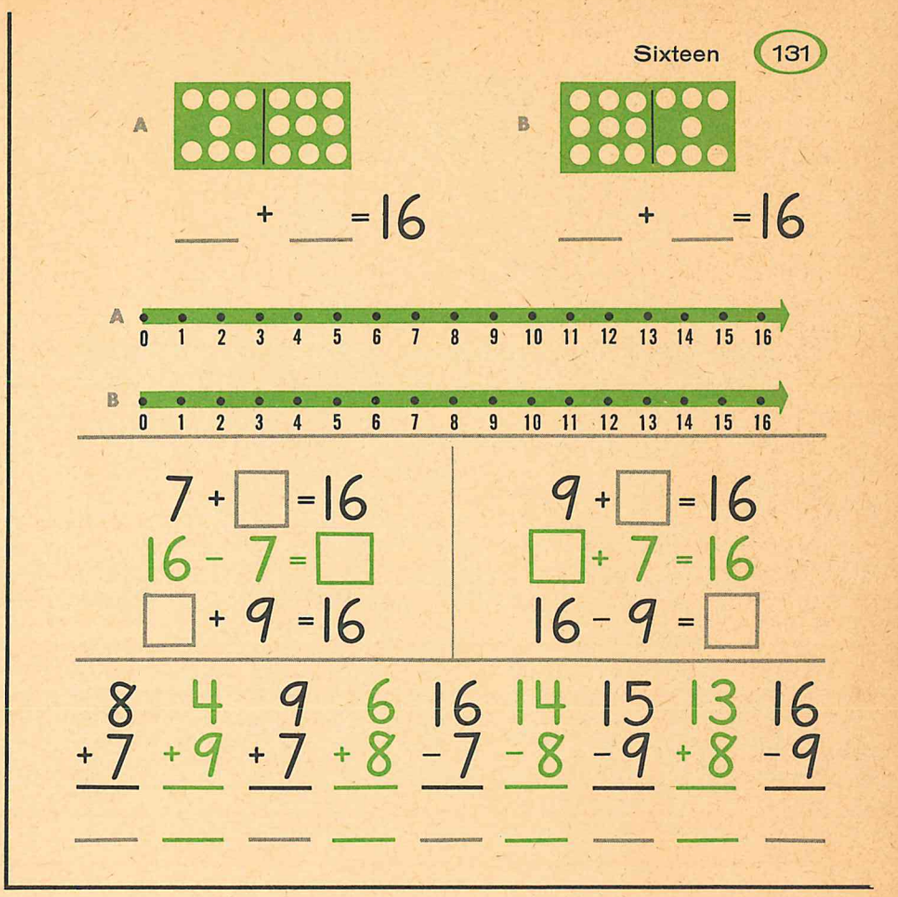
$7 + 9 = 16$	$16 - 7 = 9$	$\square + 9 = 16$	$9 + \square = 16$
$9 + 7 = 16$	$16 - 9 = 7$	$\square + 7 = 16$	$7 + \square = 16$

Have pupils take turns showing each of these on the number line.

Put the oaktag parking lot on a table together with the 16 toy cars. Set up problem situations which focus on 7, 9, and 16, such as: **There were 16 cars in the parking lot. Nine of them had been driven out by noon.** Have a child complete the statement of the problem. Have another child write the number sentence for it ($16 - 9 = \_\_$).

There are 9 cars in the lot. Have a child finish stating the problem. Have the number sentence $9 + \_\_ = 16$ written on the chalkboard.

Then have the group set up a variety of situations from which many different story problems will be created. Ask what number sentence tells the story. This type of activity is excellent for developing problem-solving ability.



Procedure

Open your books to page 131.

What is the number word at the top of the page? [sixteen] **What is the long way to read 16?** [1 ten and 6 ones]

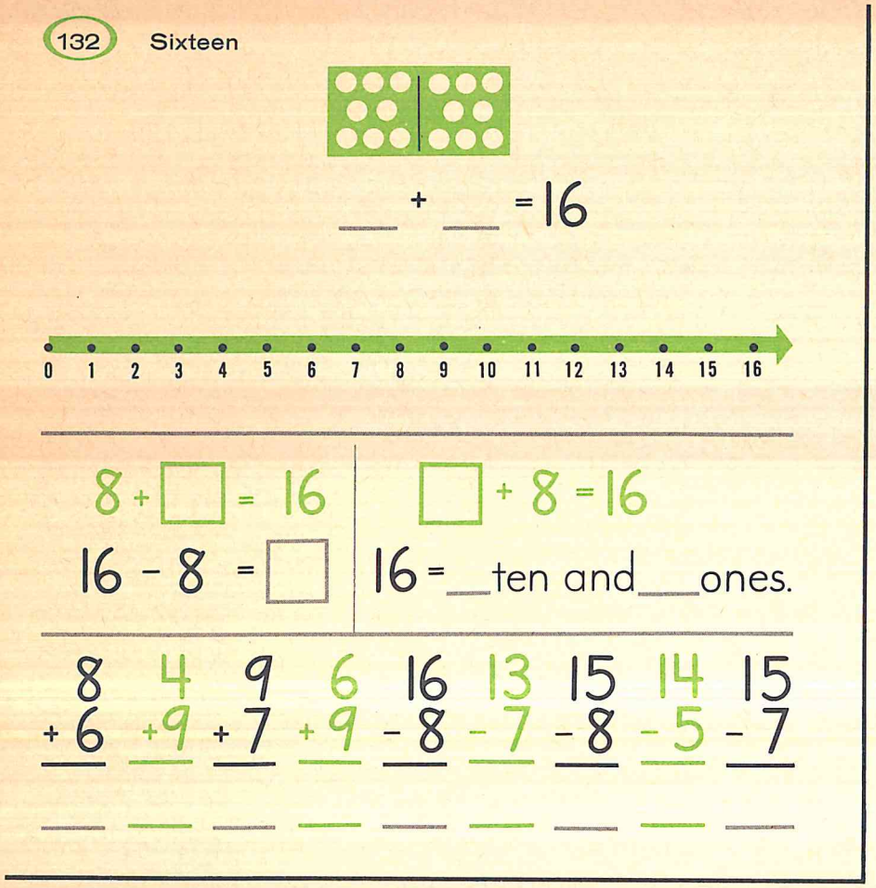
What is the number sentence for the A domino? [$7 + 9 = 16$] **What is the number sentence for the B domino?** [$9 + 7 = 16$] **Write them on the lines. Then show these number sentences on number lines A and B.**

As you work the rest of the page, watch the signs! Are we sitting tall?

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Put $\square + \diamond = 14$ and $\diamond + \square = 15$ on the chalkboard. **We will play the number-frame game with these. Do you remember the rules?** (See page 130.) **Find as many answers to the examples as you can.** Evaluate.



132

Purpose

To extend understanding of the addition and subtraction relationships in 8, 8, and 16.

Materials

A set of 16 counters for each pupil, a chalkboard number line.

Developmental Activity

Place 16 counters in a straight row. Separate them into two sets of 8 each. How many number sentences can we write about these groups? Develop:

$8 + 8 = \square$ $16 - 8 = \square$ $8 + \square = 16$ $\square + 8 = 16$

Can we make up a number story for each of these sentences? Put each sentence on the chalkboard and below it write a number story as a pupil dictates it. For example:

$16 - 8 = \square$

There are 16 seats in the back row of the auditorium. Boys from Miss Jones' room sat in 8 of them. How many seats were left?

Procedure

Open your books to page 132.

What is the number word at the top of the page? [sixteen] **What is the long way to read 16?** [1 ten and 6 ones]

You know how to work this kind of page. Go ahead and write in the answers. Write neatly.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Put $\square - \diamond = 2$ on the chalkboard. **How can we work this example?** Have the children give several solutions. [4 − 2, 6 −4, etc.] **Number from 1 to 10 on your paper. Show ten different answers to this number-frame sentence.**

Some pupils will discover the Law of Compensation with respect to subtraction. If they add the same amount to each element on the left side of the equation, the answer will remain constant.

$5 - 2 = 3$

Add 3 to both numbers to the left of the equal sign.

$(5 + 3) - (2 + 3) = 3$

$8 - 5 = 3$

This law should be expressed in the children's own way and language at this level. This may be done effectively by having several pupils demonstrate with counters or objects.

133

Purpose

To find the missing addend.

Materials

A set of 16 counters for each pupil, a chalkboard number line.

Developmental Activity

Take out a set of 16 counters. We have worked many examples like this: $5 + 5 + \square = 15$. Put this on the chalkboard. Discuss. **Today we are going to see how many number names for 16 we can make, using three groups of 9 or less.** As names are suggested, do two things:

(1) Have the pupils show the name with their counters.

(2) Have a pupil write the number sentence on the chalkboard.

Zero will not appear as an addend if pupils show the name with their counters. If it is suggested, say that zero will not be used today.

Procedure

Open your books to page 133.

In each of the boxes you will see a set of unfinished number names. Complete each one so that it is another name for the number at the top of the box. Put your answer in the empty frame. Write carefully.

Circulate and give help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Put $\square + \diamond + 2 = 16$ on the chalkboard. **Write as many numerals as you can to finish this sentence. Remember the rule! Nine is the largest number you may use here.**

Evaluate the solutions at the chalkboard. Four are possible:

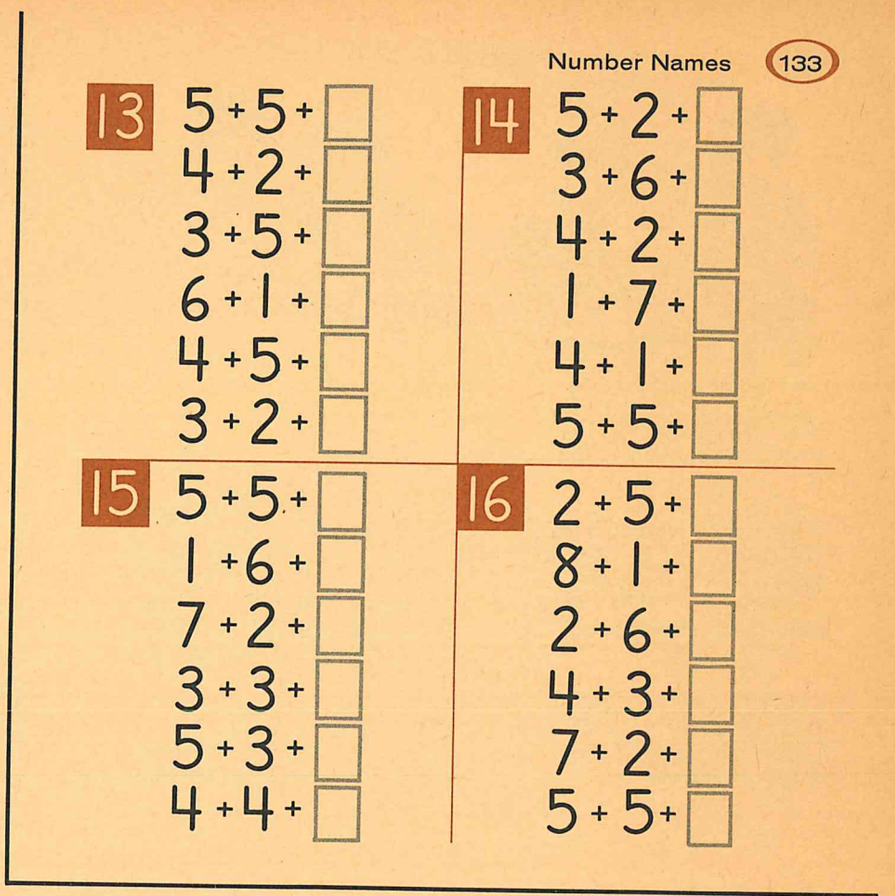
$$\boxed{8} + \diamond 6 + 2 = 16$$

$$\boxed{9} + \diamond 5 + 2 = 16$$

$$\boxed{6} + \diamond 8 + 2 = 16$$

$$\boxed{5} + \diamond 9 + 2 = 16$$

Seven and 7 and 2 are 16. Why can't we use 7 and 7 in our game? [Frames are not the same.]

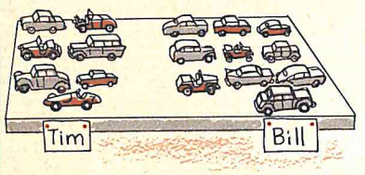


134 Tim and Bill Compare Collections

1. Tim and Bill had 16 colored rocks. One day they divided the rocks into 2 equal groups. How many rocks did each one get? _____

2. One rainy day they put their butterfly collection in boxes. Tim put in 6 butterflies. Bill put in 8. Who put in more butterflies? _____

How many more? ..... _____



3. Daddy built a shelf for their toy cars. Tim had 7 cars. Bill had 10. How many fewer cars did Tim have than Bill? _____

4. They put their airplane picture cards on the wall. Tim put up 12 cards and Bill put up 4. How many cards did they put up all together? _____

134

Purpose

To give practice in solving written story problems.

Vocabulary

Collection, each one, more, divided, how many more, all together, how many fewer.

Materials

Pictures of items mentioned in story problems or some real rocks, butterflies, cars, and picture cards of airplanes. A set of 16 counters for each pupil.

Developmental Activity

Put 16 counters on your desk. Divide them into two equal groups. Have the children do this by counting by 1's. How many are in each group? Is there a faster way to divide the counters? [counting by 2's]

Procedure

Work with small groups.

Open your books to page 134.

Today we are going to read some problems about two boys, Tim and Bill, who are brothers and share the same room. They each had several collections. I wonder if you can tell from the pictures what their collections were.

Call on a child to read the first problem. **What does it tell us? What else? What does this problem ask us? How can we find the answer?** Ask how the picture can help the children find or check the answer. **Write the answer. How many rocks did Tim get? How many did Bill get?**

Who will read the second problem? What does it tell us? How many answers do we need for the second problem? How do you know? Draw from the pupils all the relevant facts. **What does it ask us? What else does it ask us? How can we find the answer to the first question? Write it. How can we find the answer to the second question?** If the children have not used the picture to solve the problem, have them use it to check their answers.

Read problem number 3 to yourself. Think about what it tells you. Think about what it asks you. Think about how you can find the answer. Write the answer.

For problem 4 use a procedure like that used for the first two problems. If your group is a fast one, let them work it independently.

Then have problem 3 read aloud. See how many children solved it correctly. Work it out with those who had it incorrect.

Extended Activity

Pass out sheets of 9″ x 12″ ruled newsprint. On one side have the children write the numeral 13 and on the other side 14.

Write 10 other names for each of these numbers. Be neat!

Evaluate as a group. **What are some of the interesting answers?**

135

Purpose

To introduce two-place subtraction.

None of the examples on this page involves regrouping, so it makes no difference whether the tens or the ones are subtracted first. At this stage of development it is well to continue the left to right progression, subtracting first the tens, then the ones. The transition to the usual order of subtracting is easy and can be made when the children are aware of the function it serves.

Materials

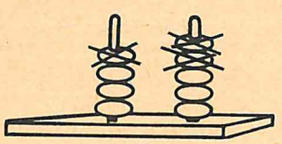
A chalkboard abacus.

Developmental Activity

Put an abacus picture of 45 on the chalkboard. **What number does this stand for?** [45 or 4 tens and 5 ones] Write on the chalkboard:

$$\begin{array}{r} 45 \\ -\ 12 \\ \hline \end{array}$$

How can we subtract 12 from 45? Let's work with the abacus first. Pupils will tell the story. **Take away 1 ten and 2 ones.** Erase them or cross them off on the abacus. **What is left?** [3 tens and 3 ones or 33]



Now work with the numerals.

$$\begin{array}{r} 45 \\ -\ 12 \\ \hline 33 \end{array}$$

Write on the chalkboard:

$$\begin{array}{r} 34 \\ -\ 21 \\ \hline \end{array} \qquad \begin{array}{r} 56 \\ -\ 32 \\ \hline \end{array} \qquad \begin{array}{r} 48 \\ -\ 24 \\ \hline \end{array}$$

Have pupils go to the board and work them. **These are easy, aren't they?**

Procedure

Open your books to page 135.

These are like the examples we have been working. What is the answer to the first one? [14—1 ten and 4 ones] **Write the answer to each example. Be neat.**

Circulate and help as needed.

Are we sitting up tall?

Subtracting Tens and Ones

36 = __ tens and __ ones −22 = __ tens and __ ones = __ ten and __ ones	58 = __ tens and __ ones −21 = __ tens and __ one = __ tens and __ ones
47 = __ tens and __ ones −13 = __ ten and __ ones = __ tens and __ ones	69 = __ tens and __ ones −36 = __ tens and __ ones = __ tens and __ ones

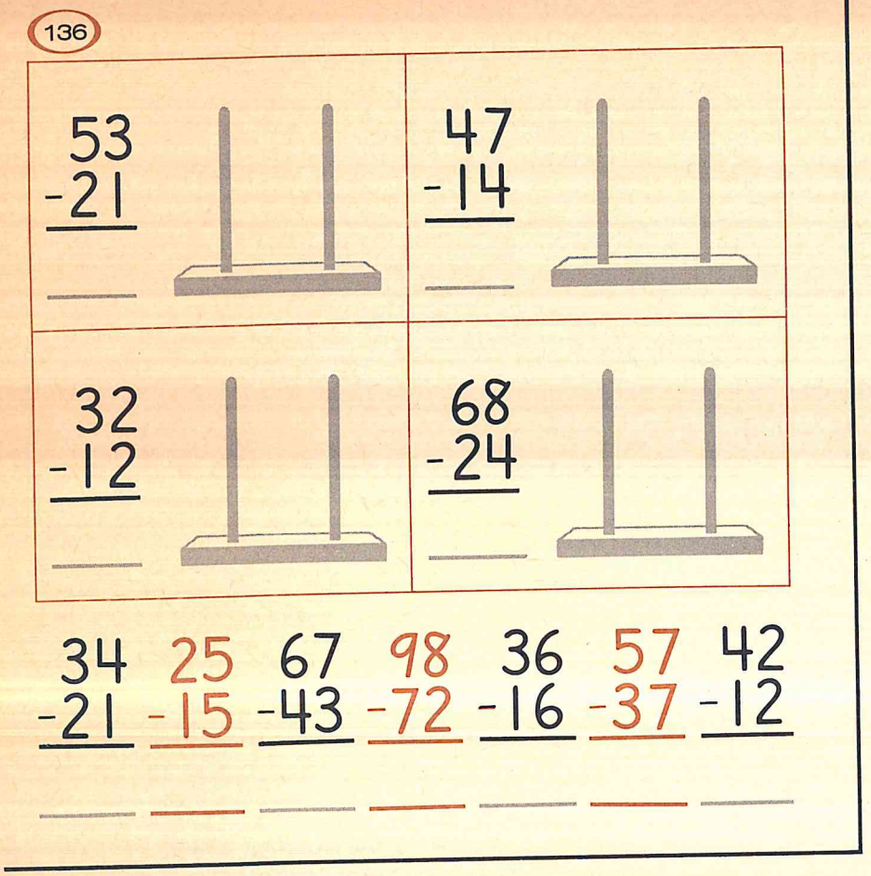
24	36	45	68	97	79
−12	−15	−23	−42	−54	−17
___	___	___	___	___	___

Extended Activity

Pass out 9″ x 12″ paper with abaci on it. Have the group show each example in the last row on an abacus. This may be done in two steps:

1. Draw "beads" to represent the top number.
2. Cross out the "beads" which represent the bottom number.

The beads which are left represent the answer.



136

Purpose

To extend two-column subtraction (no regrouping).

Materials

A chalkboard abacus.

Developmental Activity

Draw an abacus picture of 26 on the chalkboard. **What number does the abacus show?** [26 or 2 tens and 6 ones] Write 26 next to the abacus. Write 14 under the 26. Have a pupil show and tell how the example is worked. Have another pupil work the example on the abacus.

Put this row of examples on the chalkboard:

28	29	37	49	53	78	43	86
− 12	− 15	− 21	− 38	− 20	− 40	− 23	− 56

Have the pupils do two things:

(1) Show how to work each example on the chalkboard.

(2) Work it on the abacus.

Procedure

Find page 136 in your book.

These are just like the examples we have been working. What is the answer to the first one? [32] **Can you work it on the abacus? Use crayons. Write carefully.**

Circulate and help as needed.

Extended Activity

Pass out 9″ x 12″ paper with abaci on it. Have the group show each example in the last row on an abacus. This can be done in two steps:

1. Draw a "bead" picture of the top number.
2. Cross out the "bead" representation of the bottom number. The beads left represent the answer.

137

Purpose

To give children practice in reading and solving one-step problems.

Vocabulary

How much more is needed.

Materials

6″ x 9″ newsprint.

Developmental Activity

Have children work some two-column subtraction examples, including several missing addend examples, before they work page 137 and page 138.

Procedure

Open your books to page 137. (Pages 137 and 138 may be worked together, or 137 may be done and 138 worked at a later date.)

Call on various children to read the prices of the toys on pages 137 and 138.

Have one of the children read problem 1. **What does this problem tell us? What must we find out? Does the problem tell us everything we need to know to find the answer? What else must we use to help us? Now that we know how much the doll and her clothes cost, how can we find the answer to the problem?**

Work your example on the piece of paper I have given you. Then write your answer on the line. Your answer will be a certain number of cents. Will you write the cents sign in the answer? Why not?

Work the second problem in a similar manner. Then have the children complete the page. If the group is slow, work more or all of the problems with them.

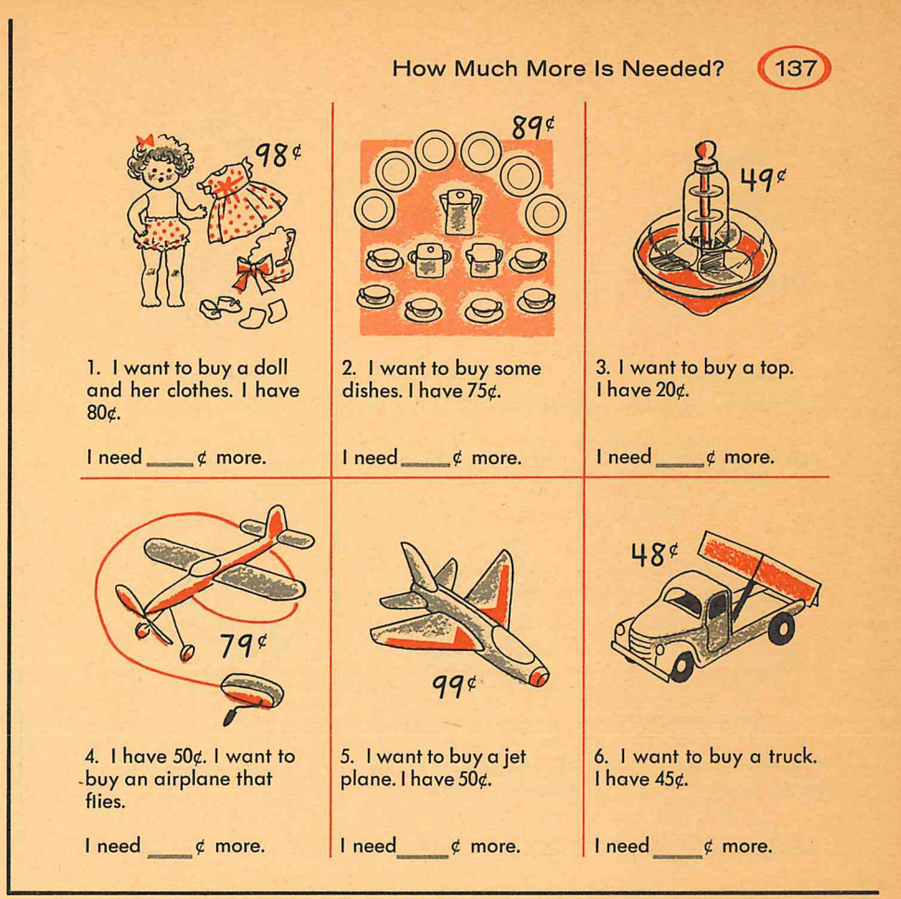
Walk about the room and observe the children as they work these pages. Notice how they are setting up their examples for computation. Help them correct any poor practices.

If you let some time elapse between the presentation of page 137 and page 138, work the first problem on page 138 (or more, depending on the ability of the group) with the children.

Circulate and observe the children's work.

Extended Activity

Have the children make up number sentences for each problem on page 137. Cent signs should not be used.


How Much More Is Needed?
137
98¢
89¢
49¢
1. I want to buy a doll and her clothes. I have 80¢.
I need ____ ¢ more.
2. I want to buy some dishes. I have 75¢.
I need ____ ¢ more.
3. I want to buy a top. I have 20¢.
I need ____ ¢ more.
79¢
99¢
48¢
4. I have 50¢. I want to buy an airplane that flies.
I need ____ ¢ more.
5. I want to buy a jet plane. I have 50¢.
I need ____ ¢ more.
6. I want to buy a truck. I have 45¢.
I need ____ ¢ more.

Give a child the amount of money mentioned in each problem (in play money). Have the child select coins to make the amount needed for a purchase.

7. I want to buy a cuddly doll. I have 25¢.

I need ____ ¢ more.

8. I want to buy a striped horse. I have 20¢.

I need ____ ¢ more.

9. I want to buy a baby doll. I have 30¢.

I need ____ ¢ more.

10. I want to buy a stuffed dog. I have 35¢.

I need ____ ¢ more.

11. I want to buy a toy kitten. I have 80¢.

I need ____ ¢ more.

12. I want to buy a drum. I have 70¢.

I need ____ ¢ more.

Extended Activity

Have the children make up original money problems about things they would like to buy. They could draw a picture for each problem, writing the price next to each item to be bought.

138

Purpose

To give children practice in reading and solving one-step problems.

Vocabulary

How much more is needed.

Materials

6″ x 9″ newsprint.

Procedure

This page is a continuation of page 137.

If some time has elapsed between the presentation of page 137 and page 138, work the first problem (or more, depending on the ability of the group) on page 138 with the children.

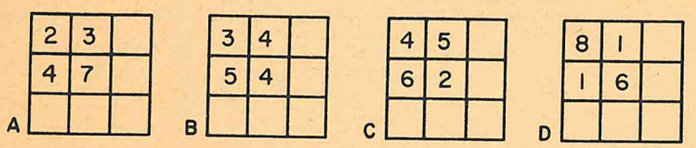
139

Purpose

To extend understanding of the grouping property in addition.

Developmental Activity

Draw number square A on the chalkboard. **These are fun, aren't they?** Have a pupil work square A. Put squares B, C, and D on the chalkboard and have different pupils work them. Have another pupil check by making up and working a column addition example that uses the same numbers.



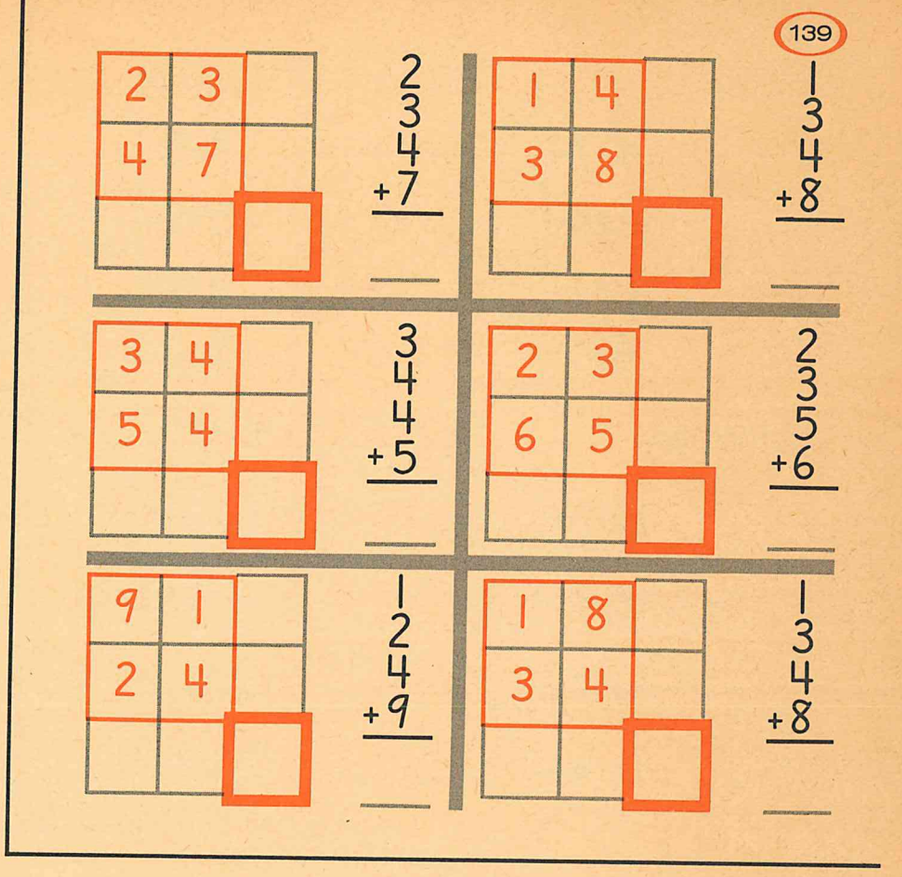
Procedure

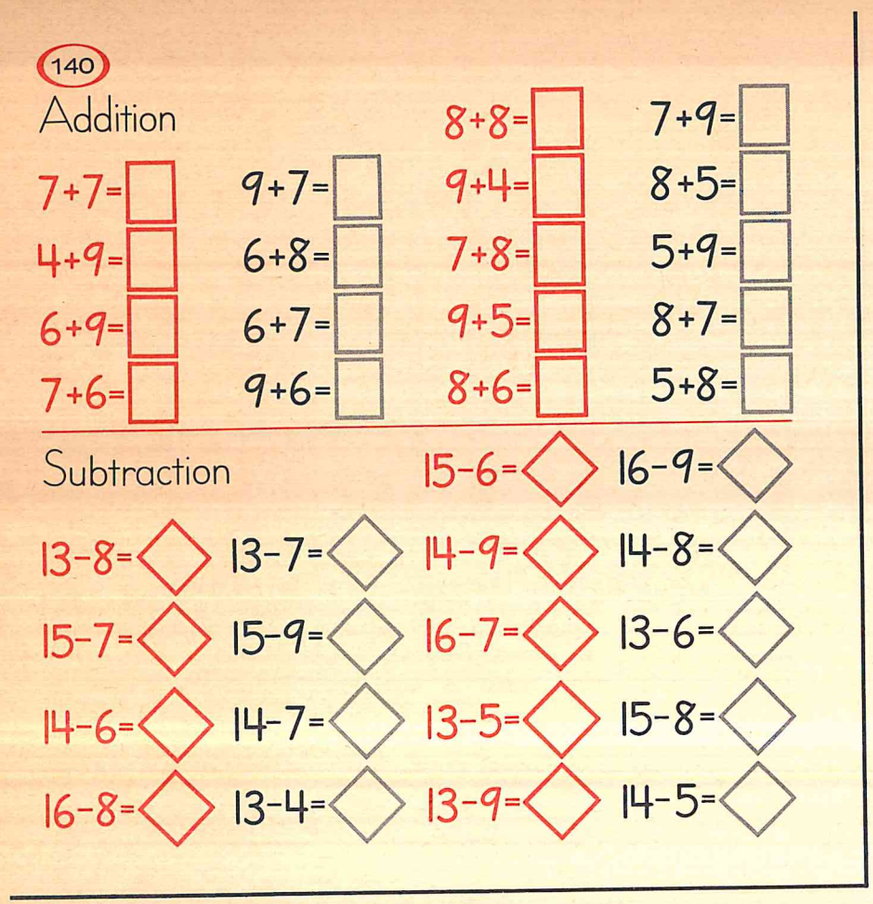
Open your books to page 139.

These examples are just like the ones we have been doing. Go ahead and work them.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Have the pupils draw 4 number squares. Let them write in their own numerals. Evaluate this activity with the group.





NAME	13						14					15				16		
	4 +9	5 +8	6 +7	7 +6	8 +5	9 +4	5 +9	6 +8	7 +7	8 +6	9 +5	6 +9	7 +8	8 +7	9 +6	7 +9	8 +8	9 +7

NAME	13						14					15				16		
	13 -4	13 -5	13 -6	13 -7	13 -8	13 -9	14 -5	14 -6	14 -7	14 -8	14 -9	15 -6	15 -7	15 -8	15 -9	16 -7	16 -8	16 -9

Extended Activity

Give oral dictation tests on the facts that are most troublesome. Pass out strips of 4″ x 12″ paper. Have the pupils number the paper from 1 to 20. Then dictate number combinations. The pupils write the answer. Have pupils make flash cards for those they miss.

140

Purpose

To test the addition and subtraction facts in 13, 14, 15, and 16.

Materials

A set of 16 counters for each pupil.

Procedure

Open your books to page 140.

Today we are going to see how well we have learned the addition and subtraction facts we have been studying. Write the answers in the frames. Be neat! Check your work with your counters.

Make scattergrams showing the errors in addition and subtraction for each pupil. If a particular example or group of examples is missed by sizable groups of pupils, reteach the combinations.

Purpose

To extend the understanding of the addition and subtraction relationships in 8, 9, 17 and 9, 9, 18.

Materials

A set of 18 counters for each pupil, a chalkboard number line.

Developmental Activity

Place 17 counters in a straight row. Separate them into a group of 8 and a group of 9. How many number sentences can we write about these groups? Explore until all of the following are developed:

$8+9=\square$ $\quad 17-8=\square$ $\quad \square+8=17$ $\quad 9+\square=17$
$9+8=\square$ $\quad 17-9=\square$ $\quad \square+9=17$ $\quad 8+\square=17$

Have a pupil write each number sentence on the chalkboard as it is suggested. Also, have pupils show each of the examples on the chalkboard number line.

Put 18 counters in a straight row. Separate them into two groups of 9 each. How many number sentences can we write about these two groups? Use the same activities with

$9+9=\square$ $\quad 18-9=\square$ $\quad 9+\square=18$ $\quad \square+9=18$

Procedure

Open your books to page 141.

What is the first number word at the top of the page? [seventeen] **What is the second number word at the top of the page?** Point to it. [eighteen]

These are the last of the addition and subtraction facts. When we have learned these, we will know all of them.

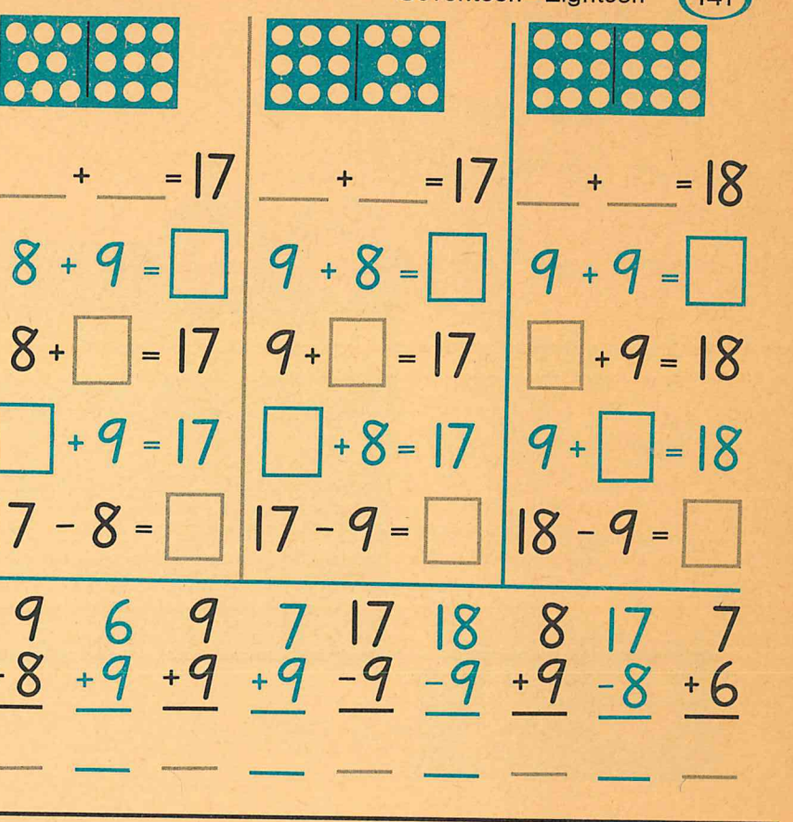
You may write the answers. Use your counters to help if you want to.

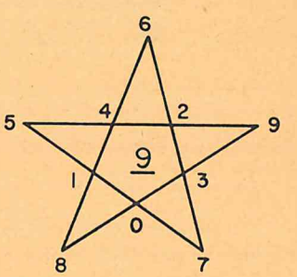
Circulate and help as needed.

Extended Activity

Make sets of 3″ x 5″ flash cards for the facts in 16, 17, and 18. Have the children practice with them to gain speed and accuracy.

Have the children play "Swing on a Star" (page 72) with 5, 6, 7, 8, and 9 in the center.





142 Who Had the Most Money?

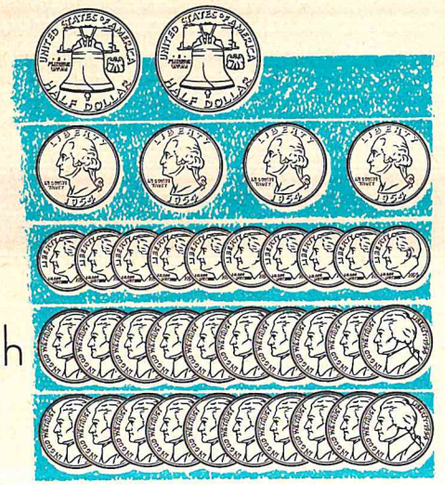
Mother gave her children
money for the school carnival

She gave Sue

She gave Sam

She gave Sally

She gave Sarah



was given to John.

142

Purpose

To introduce dollar, half dollar, and quarter. To recognize combinations of coins that are equivalent to one dollar.

Vocabulary

Dollar bill, quarter, twenty-five cents, fifty cents, half dollar, ten cents, dime, five cents, nickel.

Materials

Dollar bill, 2 half dollars, 4 quarters, 10 dimes, 20 nickels, 50 pennies.

Developmental Activity

Use toy money or real money or discs cut from tagboard to represent coins. Review equivalents by naming a sum of money, such as 10 cents, and asking the children to show with their coins how many different ways they can make that amount. Let the children explore the number of different ways they can make combinations of coins totaling 25 cents. Do the same with combinations totaling 50 cents. Ask questions relating to the number of coins used and the value of the coins to develop the relationship that the fewer the coins used to make a given sum, the larger will be the value of the coins.

Procedure

Every year there was a school carnival. Mother always went to it and took her five children with her. This year Mother told the children she would give each of them money to spend at the carnival.

Open your books to page 142 to see how much money Mother gave her children. Who can read the sentence at the top of the page? Who can read the next sentence? What coins did Mother give to Sue? [2 half dollars] Follow this procedure for each of the children.

Now let's go back and read the title of the page. Who can answer the question? [No one had the most money; all the children had 100 cents, or 1 dollar.]

Extended Activity

Distribute 20 nickels, 2 half dollars, 4 quarters, 10 nickels, and 1 dollar among the children. Use toy money or facsimiles. Have the children change 20 nickels for 10 dimes, 1 dollar bill for 2 half dollars, 20 nickels for 4 quarters, etc. Continue with manipulation and exchange of coins until all children in the group grasp the ideas of "equal to," "has the same value as," "is worth as much as."

Challenge the children to develop an equivalents chart in which mathematical groupings are illustrated (emphasize that 10 pennies equal 2 nickels or 1 dime; 5 dimes equal 2 quarters or 1 half dollar; etc.).

143

Purpose

To give practice in solving problems involving money and change.

Vocabulary

Change.

(Continued on next page.)

(Continued from page 142.)

Materials

A variety of coins, 6″ x 9″ paper.

> How we make change is a good example of the contrast between the "grocery-store" arithmetic of everyday use and the formal arithmetic of the mathematician.
>
> People almost never use subtraction in making change.

Developmental Activity

Review making change. Have the children use play money for this.

Review the equivalents for $1.00.

Procedure

Page 143 should be presented immediately after page 142.

Today we are going to read some problems about the children who had money to spend at the carnival. Open your books to page 143.

Have a child read the first problem aloud. **What does it tell you? What does it ask you? How can we find the answer?** Have coins available for the children to use if they wish. **Write the answer.**

Let's look at the second problem. Who can read the first part of this problem? What does it tell you? What does it ask you? Does the problem tell you everything you need to know to find the answer? What must we use to help us? [picture above problem] **Now that we know the price of an apple, orange, and peach, how can we find the answer? Find the answer. Write it on the line.**

Who can read the last part of the problem? What does it ask you? What must we use to find the answer? How can we find the answer? Have coins available for possible use. **Write the answer on the line.**

Use a similar procedure for the first part of the third problem. Permit the children to count coins to get the answer for the first part. **What do 4 quarters equal?**

Have a child read the second part of the problem. **What does it ask you? How much did John spend for the cars? How do you know? What else must you know to answer how much he had left?** If the children do not remember that John was given a dollar to spend, refer them back to page 142. Accept "no money" or "not any money" as answers; do not accept "nothing." **What numeral should we write to show that John had no money left?** [0]

Have a child read the first part of the fourth problem. **What does it tell you? What does it ask you? Does the problem tell you everything you must know to find the answer? What must you use to help you?** [picture above problem] **How much did each turn cost? Now can you write the answer?** If necessary, let the children count nickels to find how much Sally spent.

Who will read the last part of the problem? What does it ask you? What is one thing we must know to answer this? What is another? How much money did Sally have? Refer the children to page 142, if they do not remember. **How much did Sally spend? How do you know?** Children may use coins to find the answer. **Write the answer on the line.**

Extended Activity

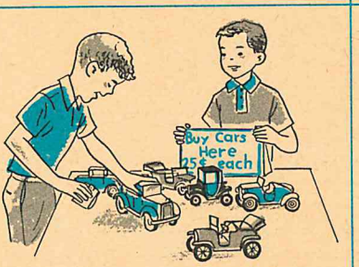
Cut out pictures of toys. Paste them on a large sheet of paper. Discuss their cost with the children. Write a price next to each. Make up oral problems about coins used for buying these toys. In some of the problems ask how much change was received.

Encourage children who have the ability to try to make up such problems.

Sue bought a ball and jacks for 10¢.
How much change did she receive from 50¢? ____¢

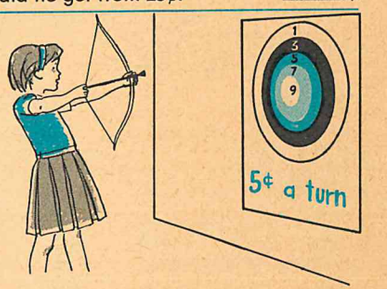
Sam bought an apple, a peach, and an orange.
How much did he spend? ____¢

How much change did he get from 25¢? ____¢



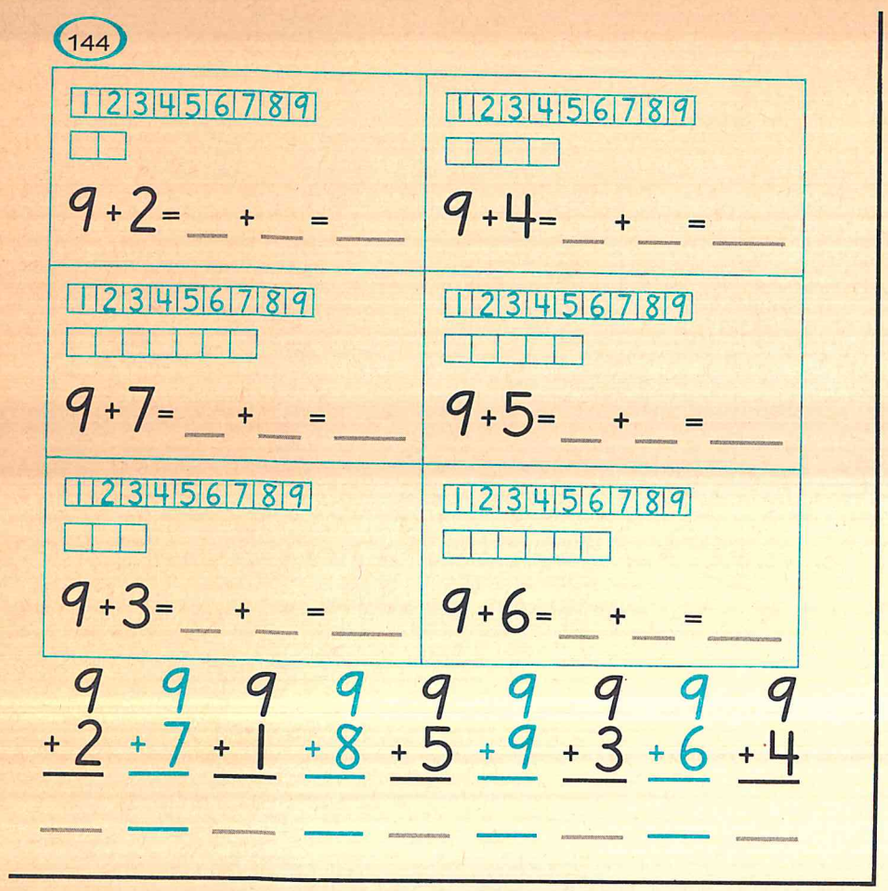
John bought 4 cars.
How much did he spend? ____¢

How much did he have left? ____¢



Sally had 5 turns. How much money did she spend? ____¢

How much did she have left? ____¢



144

Purpose

To develop a new way to add with 9 as an addend.

Materials

A set of 18 counters for each pupil, a chalkboard number line.

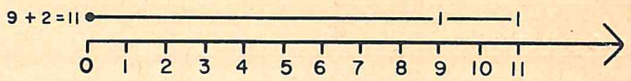
Developmental Activity

Put 9 counters in a straight row on your desk. Now put 2 more counters in a row under them. Nine and 2 are ____. [11] **Here is a new way to think when we are adding with 9. Nine and 1 more is 10. We can take 1 away from the 2-group and put it with the 9-group. What does that make?** [10] **Ten and 1 is another name for ____.** [eleven]

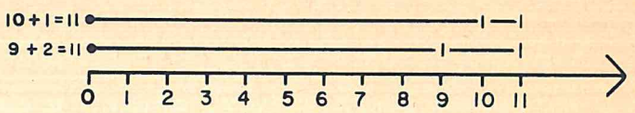
$$9 + 2 = 10 + 1 = 11$$

Repeat this procedure for $9 + 3$, $9 + 4$, $9 + 5$, $9 + 6$, $9 + 7$, and $9 + 8$. Discuss each one and have the children show it with their counters.

Have a child show this procedure on the number line. First, show $9 + 2 = 11$ on a chalkboard number line:



Then show $10 + 1 = 11$ on the same number line:



Have a pupil explain each example. Discuss whether this is a quicker way of adding. When you are sure the group has a good understanding, go on to Procedure.

Procedure

Open your books to page 144.

We will use the squares in each box in the same way as we have been using our counters. Find the row of 9 squares in the first box. Find the row of 2 squares under it. Now take 1 square away from the 2-row. Cross it off. Draw another square onto the row of 9 squares. We now have how many squares in the first row? [10] **How many in the row under it?** [1] **What is the number sentence for this?** [$10 + 1 = 11$] **We will write a 10 and 1 on the lines.** (Hold up your book and show the children where the numerals are to be written.) **Nine and 2 and 10 and 1 are both other names for ____.** [11] Work the example with the group. Work more if necessary.

How do you think we should work the bottom row of examples? Have the children work each example with their counters as in the Developmental Activity.

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. **Find as many solutions as you can to each of these number frame sentences:**

$$\square + \diamond = 15$$

$$\square + \diamond = 16$$

$$\diamond + \square = 17$$

Have the group share their answers.

145

Purpose

To develop a way to add with 8 as an addend.

Materials

A set of 18 counters for each pupil. A chalkboard number line.

Developmental Activity

Put 8 counters in a straight row on your desk. Now put 3 more counters in a row next to them. Eight and 3 are ——. [11] **In our last lesson we learned how to change 9 and another number to 10 and another number. Why?** [It can be a quicker way to add.] **Do you think we can change 8 and 3 to 10 and another number?** Pause. Several pupils will probably volunteer that if you take 2 counters from the 3-group and put them with the 8-group you will have 10 + 1. Have a pupil write on the board: 8 + 3 = 10 + 1 = 11. Repeat this procedure for 8 + 4, 8 + 5, 8 + 6, 8 + 7, and 8 + 8. Discuss each and have the children show it:

1. With their counters.
2. On the chalkboard number line (see lesson 144 for the method).

Procedure

Open your books to page 145.

We will use the squares in each box in the same way as we have been using our counters. Find the row of 8 squares in the first box. Find the row of 3 squares under it. How many squares should we take away from the 3-row? [2] **Cross out 2 squares. How many squares will we draw onto the row of 8 squares?** [2] **How many squares are in the first row now?** [10] **How many are in the row under it?** [1] **What is the number sentence for this?** [10 + 1 = 11]

Write 10 + 1 on the lines. **Eight and 3 and 10 and 1 are both other names for what?** [11]

Work the next example with the group. Work more examples if you think it necessary.

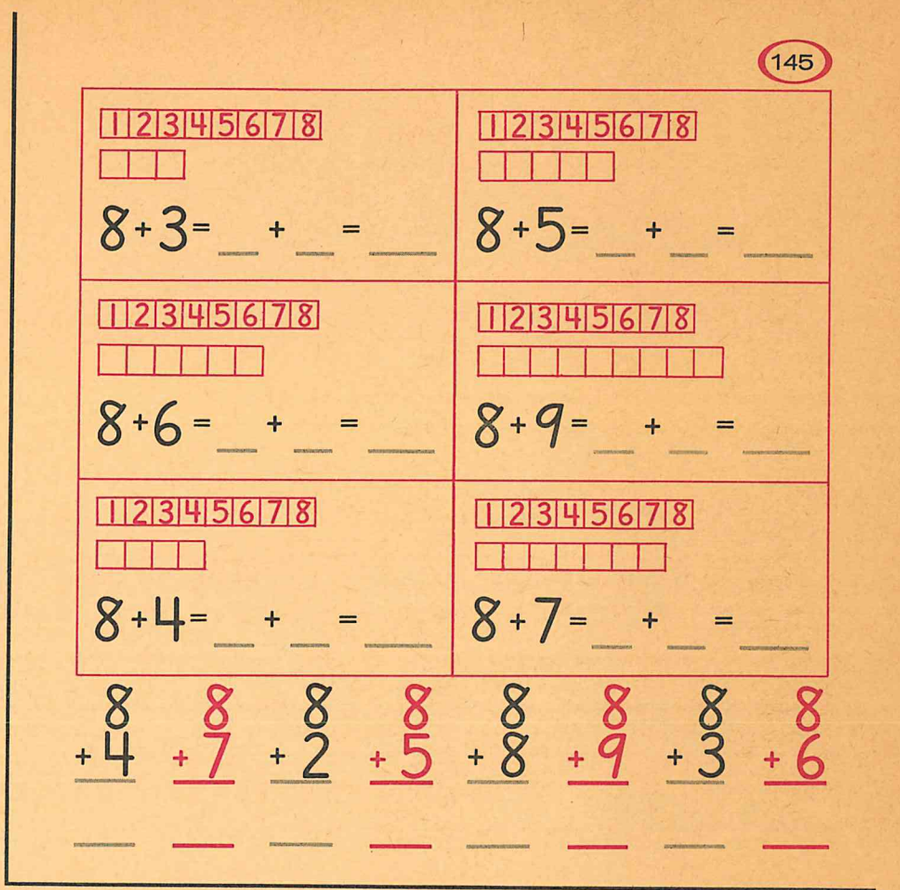
In the bottom row have the children work the examples by arranging their counters in the groups indicated by the example, then in a 10-group and another group.

Circulate and help as needed.

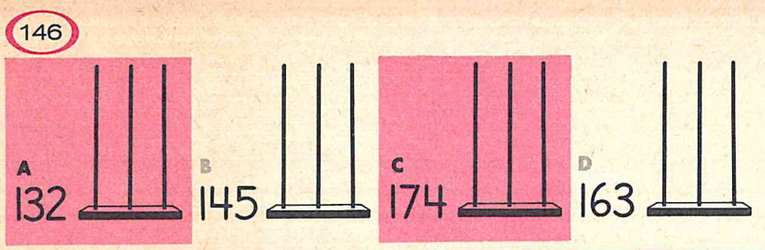
Extended Activity

Write on the chalkboard:

9 + □ = ◇ 8 + □ = ◇



Give out 6″ x 9″ ruled newsprint. **Find as many solutions as you can to each number frame sentence. Do not write any numbers larger than 9 in a square frame.**



120	130	140		160	170
121	131		151		
122			152		
		143			
124	134	144			
	135	145	155		175
				166	
			158		
129	139	149			

146

Purpose

To develop place value and meaning for three-place numerals.

Materials

A chalkboard abacus.

Developmental Activity

Today we are going to learn more about the meaning of three-place numerals. Begin by quickly reviewing several two-place numerals. Write 45 on the chalkboard. Point to the 5. **What does the numeral 5 stand for?** [5 ones] Point to the 4. **What does this numeral 4 stand for?** [4 tens] Repeat for 25.

Now we are ready for some larger ones. Who can count from 100 to 200 by 1's? Let's try, all together—100—101—102, etc. Have the group count to 120. Then have one row of children count to 130; another row count to 140, etc.

I'm going to say a number. I will write the numeral for it on the board. One hundred forty-five. Write 145 on the chalkboard. **Who can frame the part that says 45?** Have a pupil frame 45. **This part of the numeral** (point to 45; underline it) **says forty-five. The numeral is one hundred forty-five. What part of the numeral do we read as one hundred?** Discuss and have a pupil show the 1 for one hundred.

Let's read our numeral the long way as I point to each part. One hundred, four tens, five ones. On the chalkboard write the numeral the long way.

Let's try another. Put 162 on the chalkboard. **Who can find 62 in the numeral?** Have a pupil frame the 62. **What is left?** [1 hundred] **Read 162 the long way—1 hundred, 6 tens, 2 ones.**

Let's read these numerals as I point to each part. Write on the chalkboard: 164, 174, 128, 153, 137. Call on various pupils to read each numeral without help as the numeral is pointed to.

Now let's go over what we know about three-place numerals. Point to the ones' place. **This column always shows us how many _____.** [ones] Point to the tens' place. **What does this column always show?** [how many tens] Point to the hundreds' place. **This column always shows us how many _____.** [hundreds]

Now let's make an abacus picture for each of these numerals. Have individual pupils do this. This gives another opportunity to read each numeral as hundreds, tens, and ones.

Procedure

Find page 146 in your books. What do you see at the top of the page? Discuss. Call on pupils to read each of the numerals in boxes A, B, C, and D. Have them read in the usual way and the long way.

Look at the first column on the bottom part of the page. Point to it. Call on a pupil to read down the column.

What numeral is missing after 122? [123] **Write it on the line. What is the next missing numeral?** [125] **Write it. Write the missing numerals for the rest of the page. Write neatly.**

Circulate and help as needed.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Write 180 on the chalkboard. **What is this number?** [180] **Start with 180 and write the numerals to 199. Be neat. Think about what each numeral means.**

Have pupils use the numerals on this page to make up 5 "more than" and 5 "less than" examples.

147

Purpose

To extend the meaning of three-place numerals.

Materials

A chalkboard abacus.

Developmental Activity

In our last lesson we learned how to read three-place numerals and what they mean. Today we are going to look at the numerals from 200 to 299.

Write 236 on the chalkboard. **Who can read this numeral?** Have a pupil frame the 36. Have another frame the numeral that means 2 hundreds. Have the group read 236 the long way—2 hundreds, 3 tens, and 6 ones. Have a pupil show 236 on an abacus. Repeat this procedure for: 241, 269, 255, 277, 283, and 228.

Boys and girls, you are doing very well in learning how to read and write numerals in the correct arithmetic way.

Numerals on houses and in telephone numbers are not read in the arithmetic way. They are read in a special way. If you see this on a house (write 236 on the board), **you read it two thirty-six Wilson Street. How do you read 236 the arithmetic way? When we read telephone numbers we just name each numeral.** Have various pupils tell their phone numbers. List several on the chalkboard. Read the first one. Have students read the rest. **This is the telephone way to read numerals.**

Procedure

Open your books to page 147.

Let's read the numerals in the four boxes at the top. Have pupils take turns reading these—first, the regular way; then, the long way. [2 hundreds, 6 tens, 1 one]

Now show each numeral in box A, B, C, and D on the abacus next to it.

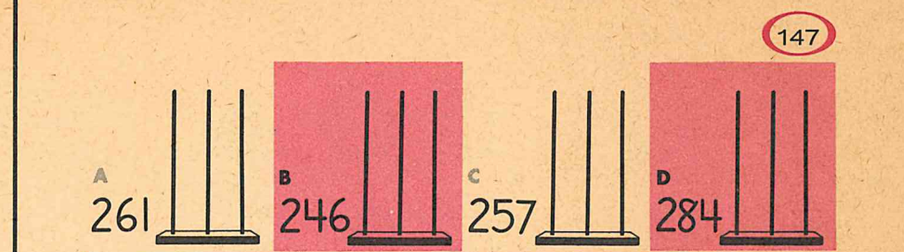
Write in the missing numerals on the bottom part of the page.

Circulate and give help as needed.

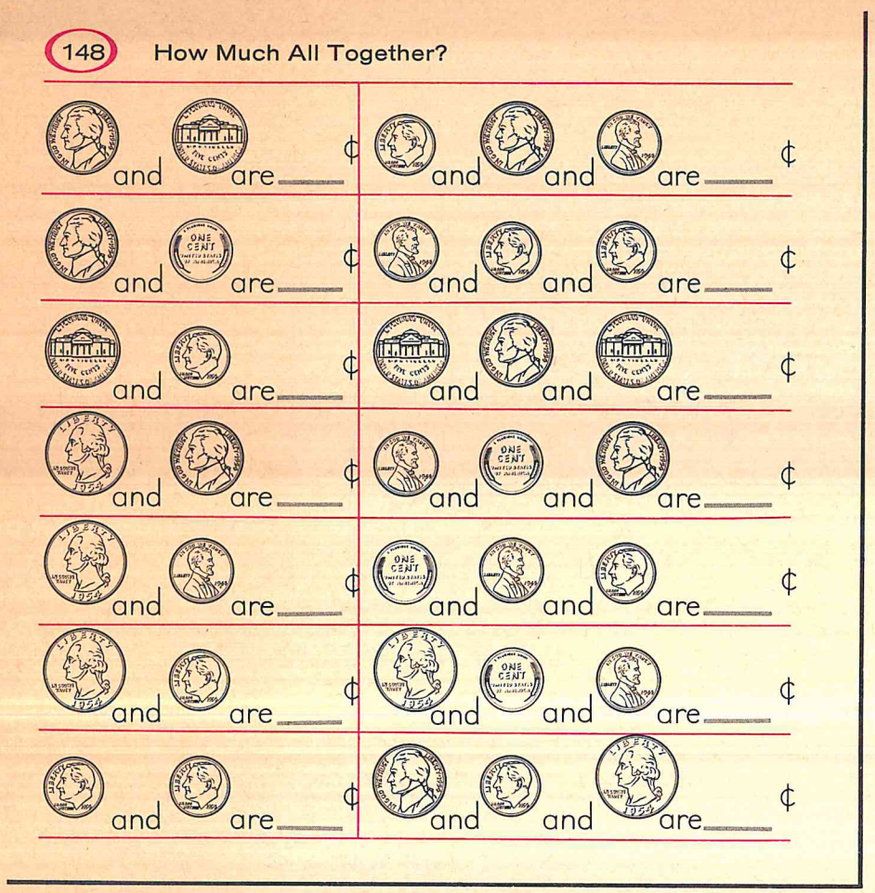
Extended Activity

Give out 6″ x 9″ ruled newsprint. Write the numeral 280 on the chalkboard. Have the children begin with 280 and write the numerals from 280 to 299. **Be neat. Think about what each numeral means.**

Have the pupils make up 5 "more than" and 5 "less than" examples using numbers from this page.



220	230	240	250		
221	231				
222					
			253		
	234				
225	235			265	275
		246			
229	239		259		



148

Purpose

To review adding coins. To review the ¢ symbol.

Vocabulary

Nickel, penny, dime, five cents, ten cents, quarter or twenty-five cents.

Materials

Real coins, cardboard coins.

Developmental Activity

Have real coins on hand. Seat a group of children around a table. Practice adding coins. Begin by adding one coin to a given coin. Exhaust all the addition possibilities with this given coin and any other single coin the children know. Continue doing this until the children can do it fairly well. Then have the children add three coins together. Exhaust all the possibilities.

If some groups need additional practice, draw the pattern used in the book on the chalkboard. Have the children work it, using real coins.

Procedure

Open your books to page 148.

Point to the first example in the left-hand column. **Who can read it?** [5¢ and 5¢ are 10¢.] **What numeral should be written in the blank space?** [10] **Do not write it now; we will write it later.**

Now look at the first example in the next column. How is this example different from the other one? [We are adding 3 coins instead of 2.] **Who can read this example?** [10¢ and 5¢ and 1¢ are 16¢.]

Now write in the answer to each example by yourself. I will watch to see if you can do this without help.

After the children have completed page 148, discuss it further with them.

Which group of coins adds up to the most money?

Look at the sixth example in the first column. How many coins are you adding here? Look at the fourth example in the second column. How many coins are you adding? Which answer is more? Repeat this procedure for other 2-coin and 3-coin examples.

For the fourth example in the first column ask: **Which coins could we use instead of the quarter?** [any equivalents of a quarter]

Extended Activity

Give the children small cardboard models of coins. See if they can make a short page on the addition of coins similar to the page they have just completed.

Correct this page and send it home so parents may see what the children have been learning about money.

149

Purpose

To determine which coins may be used to make purchases.

Vocabulary

Five, ten, fifteen, thirty, forty, fifty, almost, enough, about, less than, more than.

Materials

Pennies, nickels, dimes, quarters.

Developmental Activity

Discuss things children might buy at a drive-in or food stand. List items of food on the chalkboard. Agree on a price for each item of food and write it next to the food.

Review making change.

Procedure

Open your books to page 149.

What is the name of the drive-in?

Can anyone read the names of the food and the drinks at the drive-in? Can you tell the cost of each? Let several children read the items of food and the price of each. Give help if needed.

What one coin could you use to buy a hamburger? [quarter] **How much change would you receive?** [1 cent] **What other coins could you use?** [2 dimes and 4 pennies] **Are there any other coins you could use that would have the same value as a quarter?** Exhaust the possibilities.

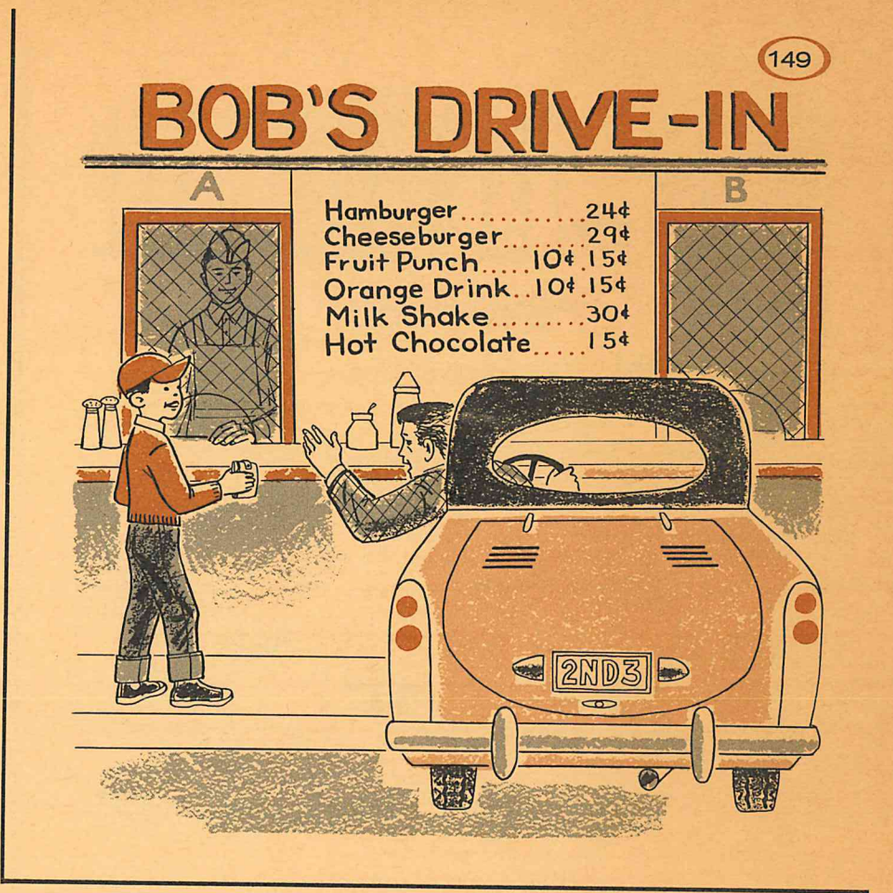
What is the price of a cheeseburger? [29¢] **In round numbers that is how many cents?** [30¢] **If you bought a cheeseburger, how much change would you receive from 30¢? What coins would you use to make 29¢** [2 dimes, 1 nickel, and 4 pennies; 5 nickels and 4 pennies; 1 dime, 3 nickels, and 4 pennies]

What else could you buy that costs about as much as a cheeseburger? [milk shake] **What different coins would come to 30¢?** (Exhaust possibilities—3 dimes, 1 quarter and a nickel, 6 nickels, 2 dimes and 2 nickels, 30 pennies.)

The fruit punch and the orange drink have two prices listed. What are they? [10¢, 15¢] **Why do you think two prices are given?** [small size, larger size]

What coins could you give for a small drink? [2 nickels, 1 dime, 1 nickel and 5 pennies, 10 pennies] **What coins could you give for a large drink?** [1 dime and 1 nickel, 3 nickels, 15 pennies, 1 dime and 5 pennies, 1 nickel and 10 pennies]

Use a similar procedure for the hot chocolate.



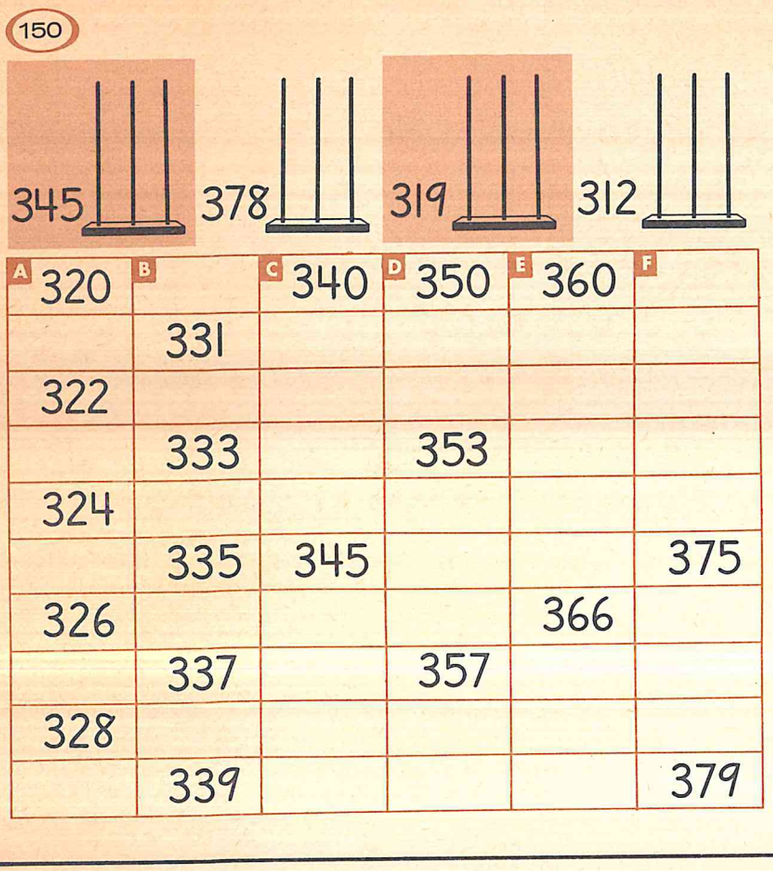
Extended Activity

I went to Bob's Drive-in. I bought a milk shake and a hamburger. Who can write how much the milk shake and hamburger cost on the chalkboard? Who can add for us? How much did I spend? [54¢] **Is this more or less than 50¢?**

Charles bought a cheeseburger and a small orange drink. Who can write how much the cheeseburger and small orange drink cost? [39¢] **Who can add these numbers? Is this more or less than a quarter?**

Mary had a hamburger and hot chocolate. Use a similar procedure for this.

Ask the children to make up some oral story problems about the drive-in. If the combinations in the examples require regrouping, have a child count coins to find the answer.



150

Purpose

To extend the meaning of three-place numerals.

Materials

A chalkboard abacus.

Developmental Activity

We already know how to read numerals from 100 to 299 and what they mean. Today we are going to study numerals from 300 to 399. Have a quick review. Put 142 on the board. **Who can read this numeral two ways?** [one hundred forty-two and 1 hundred, 4 tens, and 2 ones]

Frame the 42. **Read this part.** [forty-two] Frame the 1. **Read this part.** [one hundred]

Put 327 on the board. **Who can read this numeral two ways?** [three hundred twenty-seven and 3 hundreds, 2 tens, and 7 ones] Have someone draw an abacus picture for 327.

Repeat this procedure for 341, 375, 321, and 337. If more practice is needed, make up more examples.

Procedure

Find page 150 in your books.

First, let's read the numerals in the boxes at the top. Now draw the abacus picture to show each one. Use crayons.

On the bottom part of the page write in the missing numerals. Write carefully and neatly.

Help as needed. Also, take time to discuss anything the group notices about these examples—odd and even in columns A and B, etc.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Write the numeral 380 on the chalkboard. **Begin with 380 and write the numerals up to 399. Think about what each means.**

Make up 5 "more than" and 5 "less than" pairs using numbers from this page. Have the children share their work with the group.

151

Purpose

To extend the meaning of three-place numerals through 999.

Materials

An abacus or a chalkboard abacus.

Developmental Activity

Let's all count out loud by hundreds to 1000.

Who can show us what 500 would look like on the abacus? Repeat for 700, 400, and 800. **How would we read these the long way?** [5 hundreds, not any tens, not any ones; or no tens and no ones; or zero tens and zero ones] Discuss to clarify the meaning of zero.

> Zero tells how many tens or ones just as other numerals do. It means "not any" or "none." This point needs to be made clear. Zero does not mean "nothing."

One at a time, have the numbers in the following series: 572, 834, 985, 667, 724 (1) read two ways (2) shown on the abacus.

Procedure

Find page 151 in your books.

First, let's read the numerals in the boxes at the top.

Next draw the abacus picture to show each one. Use crayons.

Look at column A. What is the first numeral? [420] **the second?** [421] **What should the next numeral be?** [422] **Go ahead and write in all the missing numerals. Write carefully.**

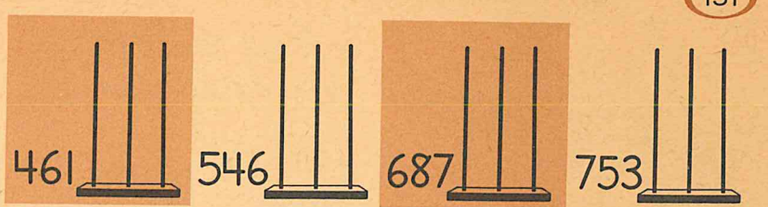
Extended Activity

Give out ruled newsprint. Have the children fold it to make 4 columns. Put the following on the chalkboard:

452	675	550	988
	684		
		560	
465			999

Have the children copy the numerals and complete each series.

Call on various children to read each series while each child checks his work.



A	B	C	D	E	F
420	526	647	781	834	953
421	527	648	782	835	954
429	535	656	790	843	962

1. George was going to day camp. He needed tennis shoes. They cost $3.90. That is almost _____

2. George needed a new sweat shirt. It cost $2.98. That is almost _____

3. His mother bought 3 pairs of socks for $1.98. In round numbers that is _____

4. George wants a new thermos bottle and lunch box. They cost $4.95. In round numbers that is _____

Find the cost in round numbers.

shoes	_____
shirt	_____
socks	_____
lunch box	_____
Total	_____

152

Purpose

To introduce the dollar sign ($) and cent point (.). To teach how to round money to the nearest dollar. To give practice in three-place column addition with money.

Vocabulary

Cost, almost, total, round numbers.

Materials

Pictures with prices from catalogues and newspaper advertisements. One dollar bill, ten cents.

Developmental Activity

Show the children one dollar and ten cents. **How much money do I have here? We can write this as 1 dollar and 10 cents.** On the chalkboard write: 1 dollar and 10 cents. **There is a faster way of writing it.** Write: $1.10. **We read this** (point to $1.10) **exactly as we read this** (point to 1 dollar and 10 cents). **Read this: $1.10. We call this** (point to .) **a cent point or decimal point. When we read a dollar and cents numeral, what word do we say for the cent point?** [and]

Do you know what we call this? (Point to the $ sign.)

Write the following on the chalkboard: $4.50, $3.98, $2.45, $8.75, and $5.64. Have the children read each as you point to it.

Show the children a page of newspaper advertisements. Write some prices from it on the board. Have the children read them.

If I have $1.98, I have almost how much? How do we write 2 dollars? Draw this from the children. Write $2.97 on the board. **How do you read this? Two dollars and ninety-seven cents is almost _____. In round numbers that is _____.**

Use a similar procedure for $4.90, $3.95, $5.93, and $7.98.

If any of the children have attended day camp, let them tell the group about it. If no one has had this experience, explain.

Procedure

Open your books to page 152.

Call on a child to read the first problem aloud. **What does it tell you? What must you find out? Three dollars and ninety cents is almost _____. Where should we write the answer? Remember to write the dollar sign and cent point.**

The picture next to each problem tells what George bought. What did he buy in problem 2? 3? 4?

Read each problem silently. Think of what it tells you. Think of what it asks you. Think how to find the answer. Then write the answer.

Observe the children as they work. Give help to those who need it. Give the children time to work these problems.

Now let us look at the right-hand side of the page. What does the writing at the top say? Ask someone to read it aloud. **What is the first word under this?** [shoes] **About how much did George's shoes cost?** [$4.00] **Write the $4.00 as you did on the other side of the page. Remember the dollar sign and cent point.**

What is the next word? How much in round numbers did the sweatshirt cost? [$3.00] **Write $3.00 on the line right under the $4.00.** Write $3.00 and $4.00 on the chalkboard as the children are to write them in their books.

Use a similar procedure for the socks and lunch box. Check the children's work.

What is the last word in the list? What does total mean? How can we find the total? What is the total?

Extended Activity

Have the children cut out advertisements and paste them on construction paper.

Ask various children to write the prices on the chalkboard. Have children make up "rounding to" problems.

153

Purpose

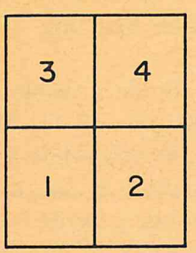
To generalize about adding and subtracting zero.

Materials

A set of 10 counters, a chalkboard number line, 3 bean bags.

Developmental Activity

Make a 24″ x 36″ or 18″ x 24″ piece of tagboard into a target for "Bean Bag Toss."



Fasten it to the floor with masking tape. Have pupils take turns tossing 3 bean bags. Add up their scores. Take time to discuss the score when the target is missed. **What number can be used to show that score?** [zero] **Zero means no score or not any score.**

Write on the chalkboard:

$$\begin{array}{rrr} 2 & 5 & 3 \\ +0 & +0 & +0 \\ \hline \end{array}$$

What is the answer to each of these examples? [2, 5, 3] **What happens when we add zero to a number?** Discuss. [The number stays the same, etc.]

Put 4 counters on your desk. If you take all 4 of them away, how many are left? [zero, none] **Who can write the number sentence to show this?** [4 − 4 = 0] Repeat with 5, 2, and 7.

Procedure

Open your books to page 153.

Discuss the pictures at the top. **Can you tell how many points Dan made?** [6] **How many did Tom make?** [5] **Write their scores in the boxes. Who won?** [Dan]

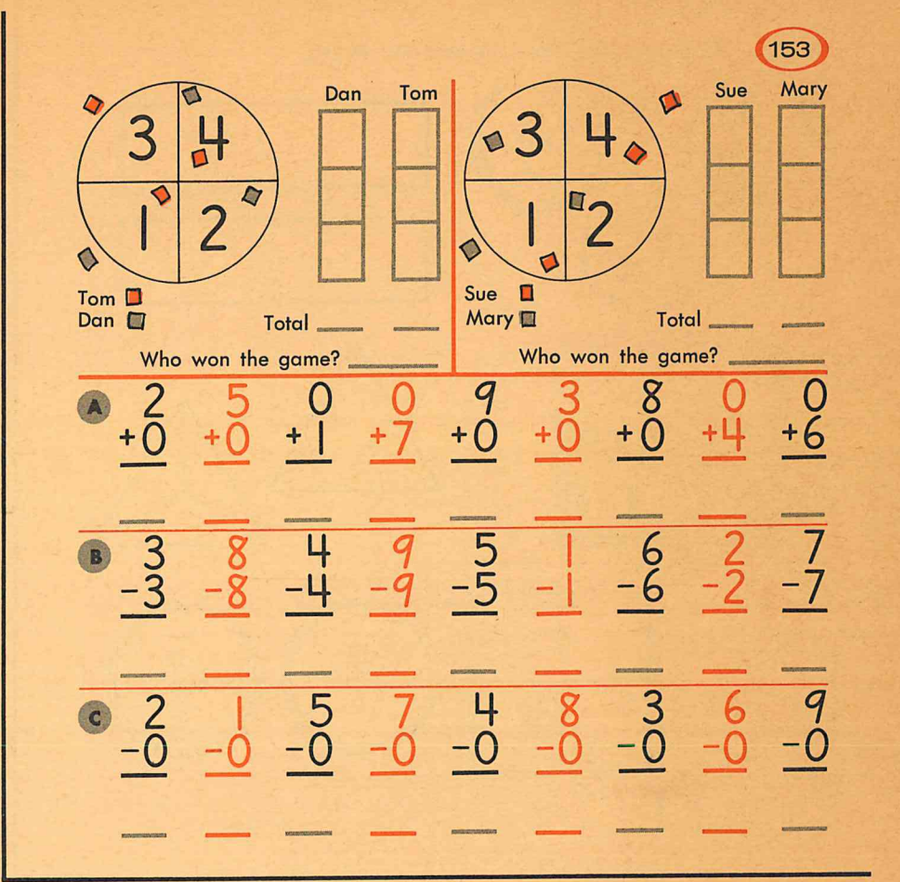
Use this procedure for the second picture, also. Sue scored 5; Mary scored 5.

Put your finger on row A. Write the answers to each example.

Put your finger on row B. Write the answers.

Put your finger on Row C. Write the answer to each example.

Encourage pupils to use counters to help show the answers to the subtraction examples or to check on their work.



When the group has finished all the rows, have them look at row A again. **What happened in Row A?** Discuss. **When we add zero to a number. . . .** Have pupils finish in their own words.

Look at row B. Discuss this row. **A number taken away from itself is always _____.** [zero]

Look at row C. What happened? Discuss. **A number take away zero is _____.** [the number]

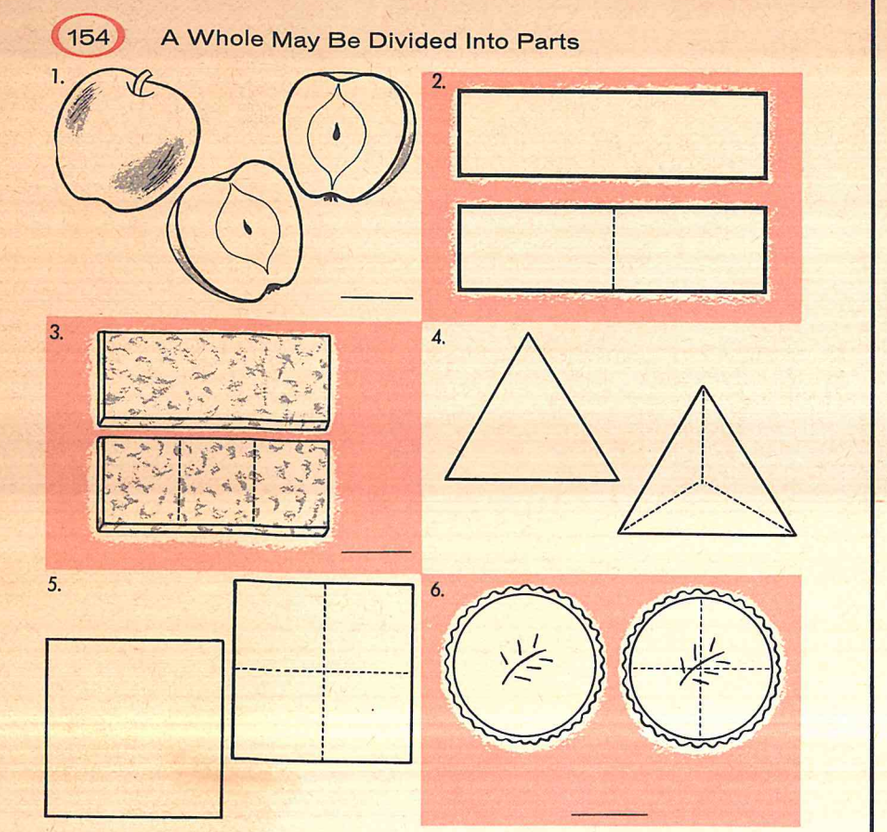
This lesson should lead the children to some insight into certain special properties of zero:

1. A number and zero equals the number.
2. A number minus zero leaves the number.
3. A number minus itself is zero.

These ideas should be expressed in the pupils' own words. No attempt should be made now to state them as laws.

Extended Activity

Pass out 6″ x 9″ ruled newsprint. Put □ + ◇ + 4 = 15 on the chalkboard. **How many answers to this number-frame sentence can you find? Nine is the largest number you may use.**



154

Purpose

To extend the children's ability to divide a whole into halves, thirds, and fourths. To introduce the form: $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$.

Vocabulary

Whole, part, one-half, one-third, one-fourth, fractional part, divide, fraction.

Materials

Apples, paper, candy, and drawings on the chalkboard.

Developmental Activity

Work with a small group at a table.

Today we are going to learn something about fractions. A fraction is a part of something. All of something is a whole. Write "whole" on the chalkboard. Through discussion lead the children to understand its difference from "hole."

Pick up an apple. **Who can tell me what I have in my hand? Is it a part or a fraction of an apple?** [No, it is a whole apple.] **Watch carefully while I do something to this apple.** Take a knife and cut it into 2 equal pieces. **How many pieces of apple do I have now? I will give a piece to one of you. How much did I give away?** [one-half] **How much did I keep?** [one-half]

Show a piece of paper to the children. **I will fold this paper once, matching edges exactly, and then cut it. How many pieces of paper do I have now?** [2] At this point give each child a piece of paper and ask him to fold it once evenly and cut it. **How many pieces of paper do you each have now? We have cut one piece of paper into 2 parts. How much is each part? The fraction one-half is written like this:** $\frac{1}{2}$ (write $\frac{1}{2}$ on the chalkboard).

Now we are going to divide a whole candy bar into 3 parts. We will pretend that one piece is for Mother, one piece is for Dad, and one is for you. Watch while I cut it. Show that there are 3 pieces. **Now each piece is one of 3 pieces or one-third. One-third is written like this:** $\frac{1}{3}$ (write $\frac{1}{3}$ on the board).

Now take a triangular piece of paper. Show this to the children. Mark for cutting 3 triangles of equal size from it. Cut. Hold each piece up. **Each part is what part of the large triangle? Can anyone write this on the chalkboard?**

Give the children each a piece of paper marked into thirds. Ask them to fold it and cut it. **Each part is now how much of the whole?**

Now take a piece of paper (2″ x 2″). Ask the children if this piece is a fraction or a whole. Give each child a similar square. Ask him to fold it once, turn it sideways, then fold it again. **How many squares have you made by folding the paper?** [4] Have the children cut on all of the folded lines. **Each square is now one of 4 squares. What do we call one of 4 parts? One-fourth is written like this:** $\frac{1}{4}$. Demonstrate this on the chalkboard.

Demonstrate on the chalkboard how to cut a pie into four parts. **If there are four people in your family, each might get how much of the pie? Who can write one-fourth on the board?**

Give each child a circle. Have him fold it and cut it like the pie into 4 equal pieces.

Procedure

Now open your books to page 154.

In picture 1, color one-half of the apple. Write the fraction $\frac{1}{2}$ on the chalkboard.

In picture 2, color one-half of the paper.

In picture 3, color one-third of the candy bar. Write the fraction $\frac{1}{3}$ on the board.

(Continued on next page.)

(Continued from page 154.)

In picture 4, color one-third of the triangle.

In picture 5, color one-fourth of the folded piece of paper.

In picture 6, color one-fourth of the pie. Write the fraction $\frac{1}{4}$ on the board.

Check the children's papers. **You may take this page home and show your parents what you know about fractions.**

Extended Activity

Have the children fold a piece of drawing paper into three equal parts. At the top of the first part have them write $\frac{1}{2}$, in the next part, $\frac{1}{4}$, and in the last part, $\frac{1}{3}$. Have them draw a picture in each part to illustrate the fraction.

155

Purpose

To provide practice in reading and solving story problems.

Vocabulary

Divided, each person.

Procedure

Open your books to page 155. Look at the picture. Do you think the children are enjoying themselves?

Choose a child to read the explanation under the picture. Call on other children to read the problems aloud. (Do not have the children work them at this time.)

Point out that the second word in problem 4 is "divided." **We have divided papers into parts. We have seen apples divided in half. When your mother prepares lunch, she divides (cuts) the sandwiches into two or more parts.**

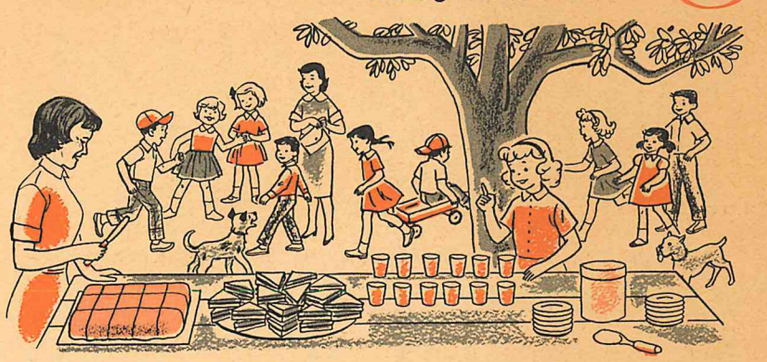
Then have them work problems 1 through 5 without help. **Read each problem carefully. Think about what the problem tells you. Think about what it asks you. Think how you can find the answer. Write the answer.**

When the children have finished, discuss problem 6 with them. Draw from them that they have not been given the information to tell exactly what the dogs ate.

Have children give their answers to the problems. Discuss how they reached the answers.

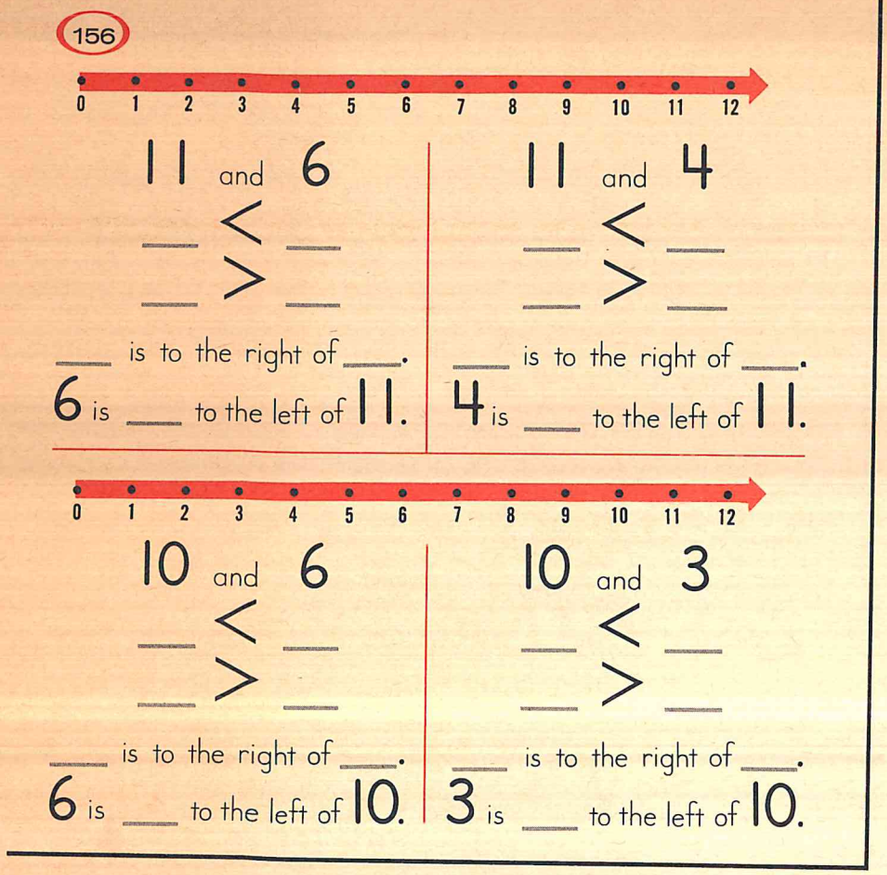
Extended Activity

Have the children make up oral story problems about the cups in the picture.



One day the children in the neighborhood went to the park for lunch. There were 4 boys and 6 girls. They brought 2 dogs with them. Two mothers also went.

1. How many people went to the park? _____
2. How many animals went to the park? _____
3. Each person ate 2 sandwiches. How many sandwiches were eaten? _____
4. They divided the cake into 3 rows. They divided each row into 5 pieces. How many pieces of cake were cut? _____
5. Each person there had a dish of ice cream. How many dishes were served? _____
6. What did the dogs have to eat? _____


156
0 1 2 3 4 5 6 7 8 9 10 11 12
11 and 6
___ < ___
___ > ___
___ is to the right of ___.
6 is ___ to the left of 11.
11 and 4
___ < ___
___ > ___
___ is to the right of ___.
4 is ___ to the left of 11.
0 1 2 3 4 5 6 7 8 9 10 11 12
10 and 6
___ < ___
___ > ___
___ is to the right of ___.
6 is ___ to the left of 10.
10 and 3
___ < ___
___ > ___
___ is to the right of ___.
3 is ___ to the left of 10.

156

Purpose

To review the ideas of right and left on the number line as "more and less" or "more than" and "less than."

Vocabulary

More than, less than, right, left.

Materials

A chalkboard number line.

Developmental Activity

Draw a number line extending from 0 through 20 on the chalkboard. Put the number pair 5, 9 on the chalkboard. **Which is more?** [9] **Who can find it on the number line?**

Which is less? [5] **Who can find it on the number line? How many units to the left of 9 is 5?** [4] Repeat for 3, 8; 9, 4; 11, 5; and 7, 2.

Make a column of the number pairs on the chalkboard:

5, 8
9, 4
11, 5
7, 2
3, 8

In each pair which number is to the right on the number line? Work with the group. **Is the number to the right the larger or smaller number of the pair?** [larger]

In each pair which number is to the left on the number line? Work with the group. **Is the number to the left on the number line the larger or smaller number of the pair?** [smaller]

Work toward the generalization that numbers get larger as we move to the right on the number line, smaller as we move to the left on the number line.

Next have various pupils make a "more than" and "less than" example for each number pair on the chalkboard—for example: $5 < 9$ and $9 > 5$.

Have pupils bring out the generalization that the statement can be written both ways for each number pair.

Next play a game. **On the number line how many units to the left of 9 is 5?** Repeat for each number pair. **How many to the right of 5 is 9?**

Procedure

Open your books to page 156.

Work the first example together orally. Then have each pupil complete the page.

Circulate and give help as needed.

Extended Activity

Put the following number pairs on the chalkboard: 5, 13; 12, 4; 13, 6; 11, 7.

Pass out ruled newsprint. Have pupils fold their papers to make 4 squares.

In each of the squares have the group complete the story as in the lesson. Have them use the "more than" and "less than" symbols and write telling which number is to the right and which is to the left on the number line. They may use their books for reference.

157

Purpose

To test mastery of the 45 addition facts having sums from 10 through 18.

Materials

A set of 18 counters for each pupil.

Procedure

Open your books to page 157.

This page is a test to see how well you know your addition facts. If you do not know an answer, draw a ring around the example and go on. Do not guess. When you are finished, go back and check each example with your counters. Work carefully.

Extended Activity

Use the same test for oral dictation work.

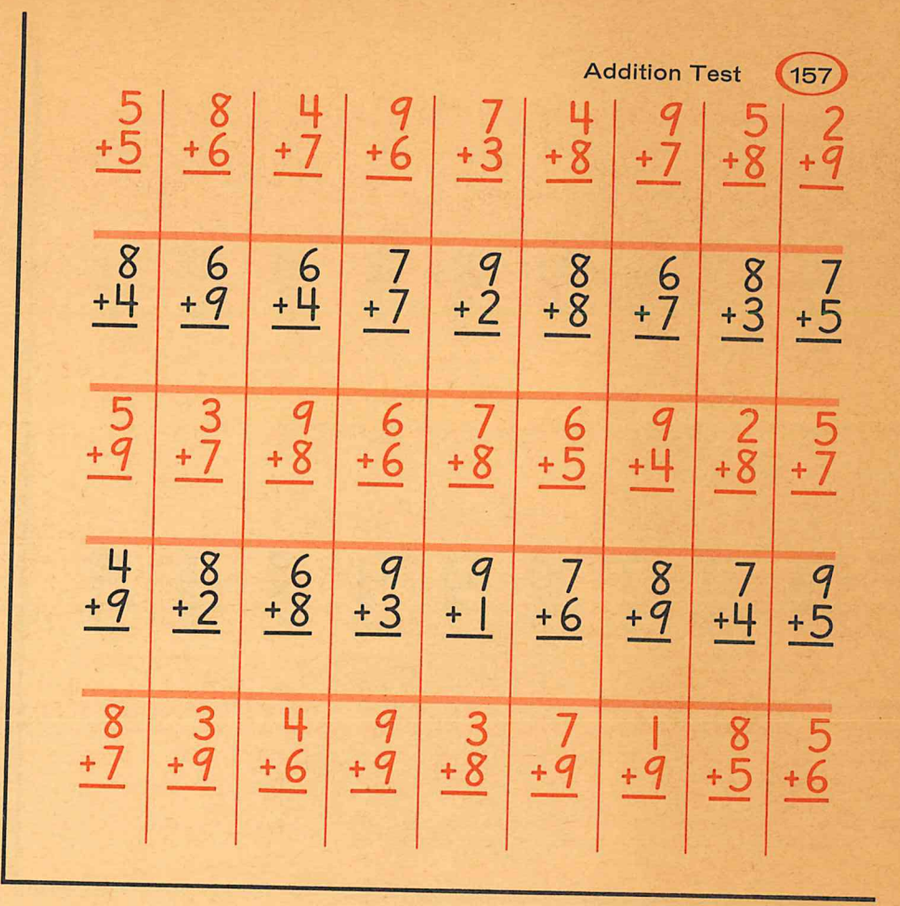
Cut 9″ x 12″ ruled newsprint into 3″ x 12″ strips. Have the pupils number vertically from 1 to 9 on one side and from 10 to 18 on the other side.

Dictate two rows of examples from the book in reverse order. (Start reading at the right and move to the left.)

Oral dictation can be given to provide speed practice when pupils know their combinations and need to build up speed. By mixing the order of dictation, this same set of facts may be used over and over again.

Have the pupils correct their own papers with crayon.

If certain facts are missed with high frequency, do a redevelopment lesson. Use counters and dominoes.



158 Subtraction Test

10 −5	14 −6	12 −9	15 −7	18 −9	11 −6	13 −5	10 −8	12 −6
13 −6	11 −7	16 −8	10 −9	14 −9	12 −8	10 −2	15 −6	11 −8
12 −5	10 −7	13 −8	15 −9	10 −3	16 −7	11 −9	14 −8	11 −4
14 −7	12 −3	17 −8	10 −6	13 −9	11 −3	13 −7	16 −9	10 −1
10 −4	15 −8	11 −2	13 −4	12 −7	17 −9	14 −5	11 −5	12 −4

158

Purpose

To test the 45 subtraction facts presented in second grade.

Materials

A set of 18 counters.

Procedure

Open your books to page 158.

This is a test to see how well you know your subtraction facts. As you work these examples do not guess at answers. If you do not know an answer, draw a ring around the example and go on with the others. When you are finished, go back and check each answer with your counters. Work carefully.

Extended Activity

Use the same test for oral dictation work.

Cut 9″ x 12″ ruled newsprint into 3″ x 12″ strips. Have the pupils number 1-9 on one side and 10-18 on the other side. Then dictate two rows of examples from the book in reverse order. (Read from right to left.)

Oral dictation may be used to provide speed practice when pupils know their combinations and need to build up speed. By mixing the order of dictation, this same set of facts may be used again and again.

Have pupils correct their own papers with crayon.

If certain facts are missed with high frequency, do a redevelopment lesson on these, using counters and dominoes.

159

Purpose

To solve story problems.

Vocabulary

Any, total, how many, how much more, how many more times.

Developmental Activity

Discuss with the children the kind of games they play at home on Saturdays or during the summer.

Today we are going to read some story problems about two boys, Jim and Jack, who had some summer fun.

Procedure

Open your books to page 159.

Have a child read the first part of the first problem aloud. **What does it tell you? What does it ask you?** Discuss what "total score" means. **What was Jim's total score? How can we find the answer?** Write the answer.

Have the children read the second part of this problem (up to the second answer line) silently. Let them solve the problem without help from you.

Can anyone tell me the answer to the next part of the problem? What is different about this answer? Write your answer neatly.

Have the children work independently to finish the problem.

Try to work the rest of the page without help. Read each problem carefully. Think about what it tells you. Think about what it asks you. Think about how you can find the answer.

Give the children scrap paper to use for their computations or for drawing pictures to help them solve the problems.

Walk around the room as unobtrusively as possible. Observe how the children are working the problems.

When everyone has finished, go over the page with the children. Then collect the papers and check them to evaluate children's ability to solve problems.

Extended Activity

Encourage the children to dictate problems for others to solve. Write some of these on the chalkboard. Make a worksheet of some of the children's problems.

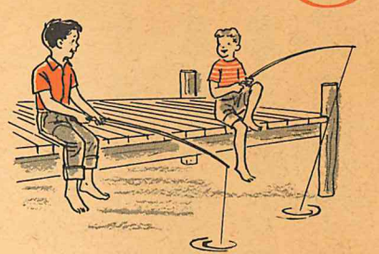
Let the very able children try to write some story problems of their own. If the mechanics of writing proves too difficult, have them stop.

Jim hit 4, 3, 2. What was his total score? ..... _____

His friend Jack scored 1, 2, and 4 points. What was his total score? _____

Who scored more points? ..... _____

How many more? ..... _____



One day Jim and Jack went fishing. Jack caught 3 fish. Jim did not catch any. How many fish were caught by the boys that day? ..... _____

Jim and Jack caught butterflies. Jim caught 5. Jack caught 4. Who caught more butterflies? _____

How many did they catch all together? ..... _____

One day they played catch. Jack caught the ball 9 times. Jim caught the ball 12 times. Who won? ..... _____

How many more times did Jim catch the ball than Jack? ..... _____

160 Equal or Not Equal?

9 + 8 = 8 + 9 ____	12 - 6 = 14 - 8 ____
6 + 7 = 5 + 9 ____	17 - 8 = 13 - 4 ____
8 + 8 = 9 + 4 ____	15 - 9 = 12 - 7 ____
7 + 6 = 8 + 7 ____	13 - 7 = 16 - 9 ____
9 + 7 = 5 + 8 ____	16 - 8 = 14 - 6 ____
4 + 8 = 9 + 5 ____	12 - 9 = 15 - 7 ____
7 + 5 = 3 + 9 ____	15 - 6 = 13 - 5 ____
6 + 8 = 4 + 9 ____	17 - 9 = 12 - 8 ____
7 + 8 = 6 + 9 ____	14 - 7 = 12 - 5 ____
8 + 5 = 6 + 6 ____	16 - 7 = 14 - 5 ____
7 + 9 = 8 + 6 ____	12 - 3 = 18 - 9 ____
9 + 3 = 5 + 7 ____	14 - 9 = 13 - 8 ____
7 + 7 = 8 + 4 ____	13 - 6 = 15 - 8 ____

160

Purpose

To determine whether the statements on each side of the equal sign are names for the same number. To give practice with the more difficult addition and subtraction pairs.

Developmental Activity

Put sets A and B on the chalkboard:

A	B
$8+4=7+5$ ____	$14-6=17-9$ ____
$7+8=5+9$ ____	$17-9=16-8$ ____
$4+9=6+7$ ____	$13-5=16-9$ ____
$8+8=6+9$ ____	$12-7=14-7$ ____

Boys and girls, let's look at set A. Who remembers how to read this kind of example? [8 and 4 equals 7 and 5. Is this true?] Call on a pupil to write "yes" or "no" after each example and then explain why the answer is correct.

Repeat for set B (subtraction). Then have several pupils take turns making up examples and putting them on the chalkboard. Have pupils suggest how to change examples that are not true so that the number sentence becomes a true or correct one. (There are usually a variety of ways in which this can be done.) Encourage variety.

Procedure

Open your books to page 160.

The first column has what kind of examples? [Addition—add] **the second column?** [Subtraction—take away] **These are just like the ones we have been working. If the number sentence is true or correct, write "yes"** (write "yes" on chalkboard) **after it. If the number sentence is not true, write the word "no"** (write "no" on the chalkboard) **after it.**

When you have finished, go back and change each number sentence that is not true so that it makes a true or correct statement.

Are we sitting tall? Write neatly.

Extended Activity

Put these two sets of addition and subtraction pairs on the chalkboard (or duplicate them) and have the group work them. The procedure is the same as for the lesson. Evaluate by having pupils share different ways of making corrections to the sentences.

$3+9=8+6$ ____	$12-8=16-9$ ____
$5+8=7+8$ ____	$17-9=12-3$ ____
$9+6=8+4$ ____	$15-7=14-8$ ____
$8+5=9+8$ ____	$13-4=17-9$ ____
$7+9=5+8$ ____	$16-9=12-4$ ____
$4+8=6+7$ ____	$14-8=13-6$ ____
$7+7=8+8$ ____	$12-9=15-8$ ____

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Boldface numerals refer to pages in the Teachers Edition.

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17 seventeen	10+7		XVII
18 eighteen	10+8		XVIII
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